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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

THE EFFECT of X Rays of Different Wave-lengths upon Some Animal Tissues: Proof of Differential Action. By Prof. S. RUSS, D.Sc., F.Inst.P.—(*Illustrated*) . 637

ORIGINAL ARTICLES.

Traumatic Intestinal Rupture. By GRANT MASSIE, M.B., B.S., F.R.C.S. 640

A Case of Complete Decerebrate Rigidity in Man, with Observations on Various Reflex Reactions. By F. M. R. WALSHE, M.D., F.R.C.P.—(*Illustrated*) 644

The Relation Between the Growth-promoting and Anti-rachitic Functions of Certain Substances. By H. GOLDBLATT, M.D., and S. S. ZILVA, D.Sc.—(*Illustrated*) 647

Prenatal Care and Puerperal Mortality. By A. LEYLAND ROBINSON, M.D., F.R.C.S. 649

The Diathermy Treatment of Gonorrhœa in Women. By A. E. MILNER, M.R.C.S., and A. K. MACLACHLAN, M.B., Ch.B. 652

REVIEWS AND NOTICES OF BOOKS.

The Medical Profession in India. By Maj.-Gen. Sir Patrick Hehir, K.C.I.E., C.B., C.M.G., I.M.S..... 653

The Pathological Physiology of Surgical Diseases. By Prof. Dr. Franz Rost. Translated by Stanley P. Reiman, M.D. 654

Chirurgie de la tête et du cou, Précis de technique opératoire. By Ch. Lenormant and Pierre Brocq 654

Prognosis of Internal Diseases. By Prof. Henry L. Elsner, M.D., LL.D..... 654

Les Hépatites Amibiennes: Autochtones et Coloniales et Leur Traitement. By F. Françon and J. Hutinel 654

Recent Psychology and the Christian Religion. By Cyril E. Hudson, M.A... 654

Evolution of the Conscious Faculties. By J. Varendonck, D.Litt., D.Sc.... 655

Traité de pathologie médicale et de thérapeutique appliquée. Diagnostics de laboratoire. II. Tumeurs, par Prof. M. P. Masson 655

Life of Sir T. P. Anderson Stuart, M.D. By William Epps 655

A Green Old Age. By Prof. A. Lacassaigne. Translated by Herbert Wilson 656

Military Surgeon 656

LEADING ARTICLES.

THE COMING INSURANCE SETTLEMENT 657

THE CARE OF THE MENTALLY DEFICIENT.. 657

DIFFERENTIAL ACTION OF X RAYS 658

AYURVEDA AND UNANI ... 659

ANNOTATIONS.

The Centenary of THE LANCET 659

Primary Carcinoma of the Thymus 659

The Welfare of the Blind. 660

Auto-Pyo-Therapy 660

The Milne Treatment of Scarlet Fever 661

The Registrar-General's Report for 1921 661

A Standard for Mental Hospitals 661

A Central Medical Institute for Paisley 662

Distribution of Acromegalic Stigmata..... 662

Board of Control: Annual Report 662

London Medical Exhibition 663

MODERN TECHNIQUE IN TREATMENT.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXXVIII.—The Treatment of Glycosuria in Pregnancy. By GEORGE GRAHAM, M.D., F.R.C.P. 663

SPECIAL ARTICLES.

Studies on the Pneumococcus: The Medical Research Council Report 665

Vital Statistics for 1921: The Registrar-General's Review.—(*Illustrated*) .. 666

The Meeting of the British Association: Section of Physiology.—Section of Anthropology 668

Indigenous Systems of Medicine in India: Report of the Madras Committee: Ayurvedic "Humoral" Theory.—Indian Methods of Diagnosis 669

Insulin Medication: A Compendium of Experiences: Recovery of Tolerance.—Diabetic Coma.—The Effects of Dextrose and Lævulose.—Results from Switzerland and Germany.—Standardisation of Insulin 671

PUBLIC HEALTH SERVICES.

Reports of Medical Officers of Health: Northamptonshire.—Warwickshire.—Cambridgeshire.—Cumberland.—East Suffolk.—West Suffolk.—Fife 673

CORRESPONDENCE.

Cancer and Diet (Dr. S. Monckton Copeman) ... 675

Probability and Extra-sensorial Channels of Knowledge (Dr. Major Greenwood) 675

A Plea for the Nationalisation of Our Mental Hospitals (Dr. A. T. W. Forrester) 676

Injury and Diseases of the Articulations (Dr. H. Warren Crowe) 678

The Causation and Treatment of Pruritus Ani (Major F. J. W. Porter) 678

The Milne Treatment of Scarlet Fever (Dr. A. H. G. Burton) 679

OBITUARY.

Margaret Boileau, M.B., B.S. 679

The late Mr. H. D. Farnell 679

THE SERVICES.

Changes in the Directorship of the Medical Services.—Royal Army Medical Corps.—Indian Medical Service.—Royal Air Force.—Deaths in the Services 680

MEDICAL NEWS.

Fellowship of Medicine and Post-Graduate Medical Association 680

Royal Sanitary Institute.. 663

Guy's Hospital Biennial Dinner 680

Central London Throat, Nose, and Ear Hospital. 680

National Hospital for the Paralysed and Epileptic, Queen-square, Bloomsbury, W.C. 680

Medical Defence Union .. 681

St. Thomas's Hospital ... 681

Medico-Legal Society..... 681

Medical Sickness, Annuity, and Life Assurance Society 681

Pharmaceutical Society of Great Britain 681

National Institute for the Blind 681

Charing Cross Hospital Medical School 681

Psychological and Physical Development of the Child..... 681

Donations and Bequests . 681

Cromer Cottage Hospital . 681

NOTES, COMMENTS, AND ABSTRACTS.

The Position of the Friendly Societies 683

A Maternity Nursing Home on Hospital Lines..... 683

Public Health in Bihar and Orissa.—(*Concluded*).... 683

The Treatment of Whooping-cough with Artificial Sunlight 684

The Spas of Western England and Central Wales 684

Combined W.C. Trap and Soil-pipe Branch..... 684

Medical Diary 681

Appointments 682

Vacancies..... 682

Births, Marriages, Deaths. 682

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The Effect
OF
X RAYS OF DIFFERENT WAVE-LENGTHS UPON SOME ANIMAL TISSUES.
PROOF OF DIFFERENTIAL ACTION.*

BY S. RUSS, D.Sc., F.INST.P.,
JOEL PROFESSOR OF PHYSICS IN THE UNIVERSITY OF LONDON.
(From the Cancer Research Laboratories, Middlesex Hospital.)

IN a paper[1] upon the germicidal action of ultra-violet rays, it is shown that a marked differential action exists in this part of the spectrum—i.e., electromagnetic disturbances have a different effect upon the same kind of organism according to the wave-length operating. It was found that when micro-organisms were exposed to the ultra-violet and visible radiation from a tungsten arc for a considerable period of time germicidal action stopped abruptly at λ=2960 Å.U. It was possible in this particular instance to correlate the differential action with a selective absorption by the micro-organisms of just those wave-lengths which had germicidal action upon them.

In attempting to extend this kind of experiment into the region of X rays it soon becomes certain from ordinary electroscopic absorption measurements that this correlation, even if it exists, will not be found, because the absorptive power exhibited by a medium upon a beam of X rays is dependent in so many cases solely upon the mean density of that medium. Hence, if we take a section of some animal tissue the density of which is about the same as water, the absorption which it will exert upon a beam of X rays will be practically the same as that of a layer of water of equal thickness, in spite of the fact that in the layer of tissue the composition varies from point to point according to the cellular structure involved. In order to reveal this point-to-point absorption it would be necessary to construct electroscopic instruments on a microscopic scale.

In view of these difficulties, it was decided to select X rays of a certain restricted range of wave-length, and, in the first place, to expose tissues to measured doses of this radiation. The next step was to go considerably higher in the scale of wave-length, arrange that exactly the same dose of radiation was given, and see whether the same effects were produced. If different, then it would be proved that a differential effect exists; and these experiments support this view. The proviso is inserted here that this differential effect may really be due to a selective absorption of the radiation by some constituent part of the cells, which cannot, of course, be detected by the usual absorption measurements. These experiments have been carried out on the normal skin of the rat and Jensen's rat sarcoma, which, when inoculated subcutaneously, grows progressively in a large percentage of cases. It has been shown in previous papers that the rate of growth of these tumours can be slowed up or completely stopped by accurately adjusting the dose of radiation; if growth is permanently stopped we say that a lethal dose has been given.

In view of the fact that proof of a differential action will depend almost entirely upon the reliability of the physical methods used for measuring the radiation, the subject matter of this paper is divided into two sections, the first of which is devoted to certain physical considerations.

PHYSICAL SECTION.

Ranges of Radiation Used.—The ranges of X ray wave-lengths used have been chosen so that it may be possible to draw conclusions from the observations which will be applicable to radiotherapy. One group of wave-lengths used was that which was emitted by an X ray tube running at an alternative spark-gap of 4 cm. between spheres 5 cm. in diameter; the wave-lengths would range for the most part from about 0·45 to 0·30 Å.U., and reference will be made to them in the text as "soft" X rays. The other group chosen was a comparatively small group of wave-lengths obtained by running the X ray tube at an alternative spark-gap of 10 cm. between the spheres and screening the radiation by 1 cm. of aluminium. Under these conditions the transmitted rays are not far from being homogeneous, with a wave-length of 0·168 Å.U.; reference will be made to them as "hard" X rays. The figures relating to wave-lengths are derived from aluminium absorption measurements.

Definition of the Dose of Radiation.—In this paper it has been decided to take the dose to be measured by the amount of radiation absorbed by the tissue, and it will be referred to in the animal experiments section as the absorption dose. This is different from the usual practice, which is to take the dose as measured by the product of incident intensity and time, where the incident intensity I is the amount of energy incident per second per unit area. The absorbed radiation $A=I\ (1-e^{-\mu x})$, where μ is the coefficient of absorption and x the thickness of tissue. When the wave-length is changed the value of μ is in general different, so that A and I are not in a constant ratio to one another for different kinds of radiation. In a similar way an electroscope does not measure the energy incident upon it, but only that which is absorbed in it and used to produce ionisation. We can represent this fraction approximately by $A_0=I\ (1-e^{-\mu_0 x_0})$. It is the quantity A_0 which is measured by the reading of the instrument. If we assume that A_0 bears a simple proportion to the energy absorbed by the tissue (A), and that this ratio is the same for both "hard" and "soft" rays, then the readings on the electroscope multiplied into the time measure the dose.

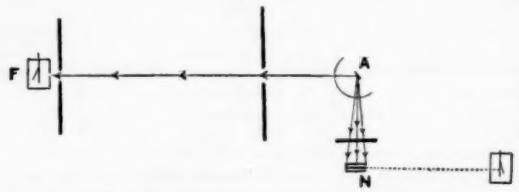
Experimental Method of Measuring the Dose.—In applying the method outlined we have to design the electroscope so that the above assumptions shall be most nearly satisfied. It is well known that when a beam of X rays meets an obstacle secondary radiation originates, and the general character of this radiation changes as the incident wave-length is varied. The resulting ionisation in, say, an air space depends upon the general character of the radiation traversing it, so it is clear that the simpler we are able to keep the conditions the more likely we are to avoid the various complications of secondary radiation. For this reason a short air path is used as our standard ionisation chamber, and it is arranged so that in the passage of the beams of X rays through this air path no solid surfaces are struck. In this way secondary and scattered radiation effects are reduced to a minimum, and we can then assume that when an equal ionisation is produced by two beams of different wave-lengths there is an equal expenditure of energy producing such ionisation in the two cases.

The experimental method of measuring the dose of radiation may be seen from Fig. 1. X rays originating at A go along the paths indicated, the vertical beam to an ionisation chamber N connected to an electroscope, which will be called the near electroscope; the horizontal beam to an ordinary gold-leaf electroscope situated in a room about 4 metres away; this will be called the far electroscope. N could be swung in and out of position, and this position, when it was receiving the vertical beam, was that occupied by the experimental material; in this way a measure was always obtained of the radiation to be used, simultaneous measurements being taken at F. When the actual exposure of the tissues took place, N had to be swung out of position, but as there had previously been simultaneous readings on F and N, it was not a difficult matter to ensure that the radiation was of the character and intensity required, for during the exposure,

* This paper appears in the Proceedings of the Royal Society, B. vol., p. 95, and is here reproduced by permission.
[1] Browning and Russ: Proc. Roy. Soc., B. vol., p. 90 (1917).

which in some cases lasted over an hour, observations of the intensity at F were made every minute; in this way an invaluable check upon the constancy of the radiation was obtained, and any variations in it were made good by a slight lengthening or shortening of the exposure. F and N were standardised before use on all occasions by means of a known quantity of radium.

FIG. 1.



Effect of Variations in the Ionisation Chamber.—It has already been mentioned that the form of ionisation chamber at N, which we look upon as the standard, consisted of a simple air path. This was obtained by taking a lead cylinder and cutting a small hole in it transversely to its length. Two electrodes were set up vertically within the cylinder, so that the beam of X rays came down between them but without touching them; one was connected by means of a wire to a gold-leaf electroscope about 6 feet away; the other terminal was earthed. The saturation current obtained when X rays of a certain wave-length traversed the air gap was taken to be proportional to the quantity of radiation absorbed. The actual reading when multiplied by the time of exposure constitutes a measure of the dose. When used for measuring X rays of a different wave-length the output can be adjusted to give the same reading on the electroscope, and so equal doses can be given.

The ionisation curves obtained with this air chamber for the two regions of wave-length under investigation are practically identical; see Fig. 2, in which the crosses correspond to "hard" rays and the circles to "soft" rays. This is a graph of a number of simultaneous observations on the near and far electroscopes; by using a diaphragm in front of F it was possible to get identical readings on F with "hard" and "soft," when these beams were giving identical readings on N.

Various ionisation chambers were used and the effect of varying the ionisation chamber at N is shown in Fig. 3. These three graphs were obtained in the manner just described; the ionisation chamber in (*b*) was a shallow wooden box with a central electrode of wood, in (*c*) it was the same box, but the central electrode was of aluminium, and in (*d*) it was a shallow aluminium box with an electrode of the same metal. The graphs show that when equal readings are obtained on the near electroscope, the readings of the far one are higher when dealing with "hard" than with "soft" rays, except when the air ionisation chamber is used.

TABLE I.

Ionisation chamber used at N.	Ratios of readings of far and near electroscopes for different rays when near electroscope gives uniform readings.
(*a*) Air ionisation chamber only ..	1·0
(*b*) Wood ionisation chamber: wood electrode	1·37
(*c*) Wood ionisation chamber: aluminium electrode	1·73
(*d*) Aluminium ionisation chamber: aluminium electrode	2·03
(*e*) Paper ionisation chamber: aluminium electrode	2·52

Table I. shows the extent to which this is the case. It follows that when we use, say, chamber (*d*), and adjust the readings of N to equality for "hard" and "soft" rays, we are really supplying in equal times doses for "hard" rays 2·03 times as great as for "soft" rays. It might be possible by using a measuring instrument which, owing to secondary radiation phenomena, specially favours "soft" X rays, that the existence of a differential effect upon animal tissues could be entirely masked. It is not unlikely that these phenomena have played some part in the observations of Friedrichs,[1] from which he has concluded that no differential effect upon tissues exists.

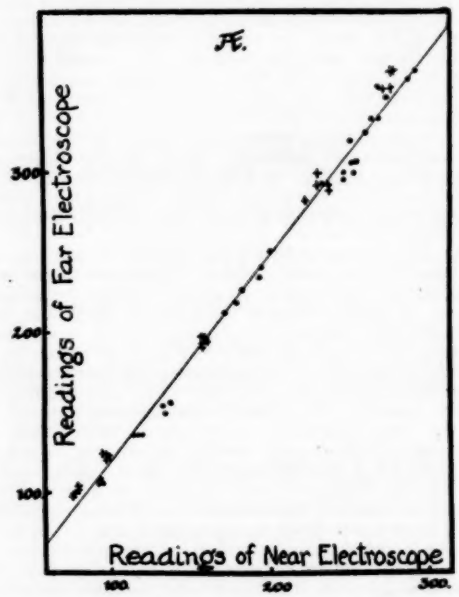
In view of the fact that the constructional features of the ionisation chamber may account for such important differences as appear in Table I. details are given below of the dimensions of (*a*), (*b*), (*c*), &c. They are as follows:—

(*a*) Air gap only—dimensions of gap about 1 × 0·4 × 2 cms.
(*b*) Rectangular parallelepiped of wood, external dimensions 3·4 cms. long, 1·5 cms. wide, and 0·4 cms. deep, thickness of wood 0·3 mm.
(*c*) Same as (*b*), but electrode of aluminium 0·2 mm. thick.
(*d*) Same dimensions as (*b*), but all of aluminium 0·3 mm. thick.
(*e*) Cylinder of thin paper about 0·8 mm. thick, length 3·5 cms., diameter 1·5 cms., central electrode an aluminium wire.

ANIMAL EXPERIMENTS SECTION.

Experiments upon Tumours.—For the tumour experiments the method of exposure was that adopted by Wedd and Russ.[2] A thin slice of tumour about 1–2 mm. thick is placed between thin sterile mica sheets and exposed to the radiation for the length of time desired; small pieces of the tumour are then inoculated into normal rats and the subsequent growth determined by frequent caliper measurements. Here again the animal variation has been eliminated as far as possible in the following way. The experimental batches of animals inoculated numbered about

FIG. 2.



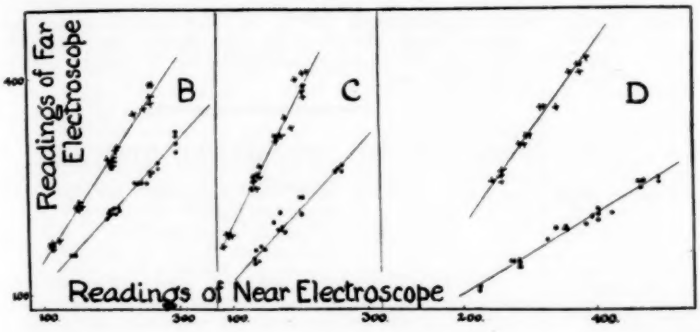
20, and each rat was usually inoculated with three small pieces of tumour; one had been exposed to "hard" rays, one to "soft," and the control had had no radiation at all.

The first step was to find the dose of "soft" X rays which was just sufficient to produce a lethal effect upon the tumour; this gave a certain rate upon the Standard electroscope at N (Fig. 1), and this rate could be accurately duplicated with "hard" X rays, and the corresponding dose of these rays could be given to the tumour. Two pieces cut from the same tumour were exposed, one to an absorption

[1] Friedrichs: Physikalische und biologische Grundlagen der Strahlentherapie (1918).
[2] Wedd and Russ: Jour. Pathology and Bacteriology, vol. xvii., p. 1 (1912–13).

dose, which was practically a lethal dose, of "soft" X rays (exposure 53 minutes), and the other to an equal absorption dose of "hard" X rays (exposure also 53 minutes). Small portions of the irradiated tumour were then inoculated into the right and left axillæ of 20 rats and non-irradiated tumour in the right groin. The Chart (Fig. 4) shows the result three weeks later, from which it will be seen that although the absorption dose of "soft" X rays was lethal to the tumour, an equal absorption dose of "hard" X rays resulted in a very considerable degree of growth. The tumours are drawn to full-scale.

FIG. 3.



In the next series of experiments upon the tumour cells it was arranged to find out how much greater an absorbed dose of "hard" X rays it was necessary to give in order to get the same effect as with "soft" rays; the effect sought was a lethal effect upon the tumour. The results in Table II. were obtained under these conditions. For any particular time of exposure the absorbed dose of "hard" rays was 2·53 *times* as great as that of the absorbed dose of "soft" rays; in spite of this increase in the amount of X ray energy absorbed it will be seen that the lethal effect was reached a little sooner with the softer radiation, so that this number would not appear to be quite large enough as a measure of the differential action.

Another experimental series undertaken, so that the absorbed dose of "hard" rays was 2·74 times as great as that of the "soft" rays, showed that in this case the lethal effect was obtained a little *sooner* with the "hard" than with the "soft" rays. Two further series on the same lines showed that the lethal effect upon the tumour was obtained with "hard" and "soft" rays when the absorbed dose of "hard" rays was in one case 2·85 and in the other 2·42 times as large as the absorbed dose of "soft" rays.

TABLE II.

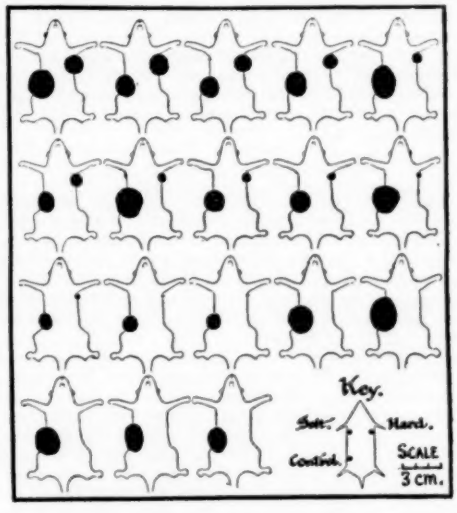
Number of animals.	Number of control inoculations which grew tumours.	Time in minutes of exposure of the tumour.	Tumour inoculations which grew after exposure to—	
			"Soft" X rays.	"Hard" X rays.
12	9	39	3	9
22	18	50	4	11
12	11	56	1	4
12	8	61	0	1

If we take the whole series into consideration, involving experiments and observations upon about 300 rats, it appears that when a quantity of energy is expended in a layer of tumour by a beam of what is here termed "soft" X rays, then in order to get the same degree of action upon the tumour (namely, prevention of growth) with a beam of what is here termed "hard" X rays, it is necessary to arrange that about 2·6 *times* (average of the numbers in the text) as much energy is expended. This number may therefore be looked upon as a numerical measure of the degree of the differential action, and might be termed the "therapeutic factor."

Skin Experiments.—In the experiments upon the normal skin the rats were given urethane and exposed to a beam of X rays projected vertically downwards. A lead screen with a square aperture was placed over the animal to localise the exposure. The screen was first placed in such a way that the aperture came between the shoulders of the animal and a dose of "soft" X rays given to this area; the screen was then moved so that the aperture came low down in the mid-line and a measured dose of "hard" X rays given to this area. By exposing two areas of the skin of the same rat, comparisons between the effects of "hard" and "soft" X rays were made more accurate. The rats were generally irradiated in pairs and in order to exclude "local" variations the upper area of one rat and lower area of the other were exposed to the same wave-lengths.

When an animal is irradiated in this way, the radiation which is scattered back from the body of the animal as the primary beam makes its way through it, contributes something to the dose absorbed by the skin. In order to allow for this fraction, when the dose of radiation was measured, a rat was placed just beneath the electroscope so that the back radiation could contribute to the ionisation produced by the direct beam. A difference could be measured with the animal in or out of position, but it only amounted to a few per cent. of the total ionisation. After the X ray exposure, a careful scrutiny was kept of the successive changes in the skin. In some cases the exposures were long enough to produce ulcers which eventually healed; with shorter exposures, the irradiated region was not damaged enough to prevent the re-growth of hair, though in most of these cases there was a loss of pigment.

FIG. 4.



A preliminary series of experiments upon 18 rats on the lines indicated served to show that in order to get the same degree of reaction in the skin it was necessary to give a considerably greater absorbed dose of "hard" than "soft" X rays. The extent of this differential action was more accurately gauged from some further results obtained after the exposure of another series of 48 rats to measured doses of the two types of radiation.

Detailed records were kept of the times at which the various reactions occurred, and in many cases the observations were continued over a period of nearly a year.

TABLE IV.—*Soft X Rays upon the Skin: Time in Days for Various Reactions.*

Time of exposure in minutes.	Epilation.		Blistering.	Healing.	Re-growth of hair.
	Partial.	Complete.			
21 [2]*	18†	—	—	—	61
28 [2]	19–24†	—	—	—	63–80
34 [10]	15–26	33 (1 only)	17 (1 only)	—	40–110
42 [2]	4–11	11–14	11–14	148	148
50 [8]	7–18	14–20	12–20	26–146	42 (1 only)

TABLE V.—*Hard X Rays upon the Skin: Time in Days for Various Reactions.*

30 [2]	40–46‡	—	—	—	—
40 [4]	18–29‡	—	—	—	—
50 [4]	14–23‡	—	—	—	—
75 [2]	59‖	—	—	—	—
90 [4]	11–29	—	—	—	—
100 [4]	21–22	33–36 (13)	—	—	52–59
125 [2]	18	30	—	—	45
150 [2]	20	24	20‡	24–30	36

* Figures in brackets denote number of rats.
† Nearly complete. ‡ Very slight. ‖ Other very slight.

The times of exposure to the "soft" rays ranged from 21–50 minutes and to the "hard" rays from 30–150 minutes, and it was found that a practically identical degree of reaction was obtained in the skin of the rats when the absorbed dose of "hard" X rays was six times that of the "soft"; this number may therefore be taken as a measure of the differential action of the two sets of wave-lengths. If we use the term "therapeutic factor" it is seen that a considerable difference is found for skin and for tumour. In several cases where the general degree of reaction of the skin to "hard" and "soft" rays was about the same (produced, however, by widely different doses) there still seemed some small difference in the nature of the reaction. With the "hard" X rays the onset of the reaction was slower, and the condition of the hair many months later was nearer the normal.

DISCUSSION OF RESULTS.

If the method by which comparison is made of the amounts of energy liberated in the tissues by the two beams of X rays under consideration is a valid one, then the results show that when equal amounts of X ray energy are absorbed from beams of different wave-lengths by animal tissues, the reactions of these tissues may differ considerably in degree and possibly to some extent in nature.

The conclusions reached have some bearing in radiotherapy. The experiments show that a bigger differential effect between "hard" and "soft" X rays exists for the skin of the rat than for the tumour cells. Provided this also holds for the human subject it is one argument for the use of very hard X rays or γ rays when tumours at a considerable depth below the skin have to be irradiated. The conclusion would perhaps be just the reverse in superficial conditions not involving the irradiation of normal skin.

The result also raises the question whether the specification which has been adopted by Seitz and Wintz [4] for expressing the carcinoma dose in terms of the skin dose is sufficiently rigorous, for this may be a function of the wave-length.

The two main results obtained are that about six times as much short wave-length energy as long wave-length energy must be expended in a layer of skin in order to produce equal reactions and that this factor falls to about 2·6 in the case of the tumour. We may question whether these are not cases in which the molecular configuration, apart from the atomic, is more affected by electrons of low than of high velocity. The experiments of C. T. R. Wilson [5] have produced direct evidence of the part which the electrons liberated in the track of a beam of X rays play in ionisation, and it would not be irrational to suppose that the slower electrons which would be released by the longer wave-length can give rise to more pronounced effects in the tissues than the quicker ones liberated by the shorter wave-length, even though a similar expenditure of energy occurs in the two cases.

[4] Seitz and Wintz: Die Röntgentiefentherapie (1920).

[5] Wilson: Proc. Roy. Soc., A. vol., p. 85 (1911).

TRAUMATIC INTESTINAL RUPTURE.

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INTESTINAL rupture, without penetration of the abdominal wall, sometimes referred to as subcutaneous rupture, is not an accident of common occurrence. The 34 cases upon which this report is based were collected from the records of Guy's Hospital between the years 1899 and 1923, a comparatively long period.

Situation of Rupture.

Stomach	4	
Duodenum	3	
Duodeno-jejunal junction	1	26
Jejunum	14	
Ileum	8	
"Small intestine"	3	
Cæcum	1	

The majority of ruptures clearly occur in the small intestine, and the comparative immunity of the stomach, the duodenum, and the colon is striking. Regarding rupture of the small intestine, the jejunum was more commonly injured than the ileum, and of the 14 jejunal lesions 7 were found within 18 inches of the duodeno-jejunal junction, an occurrence which cannot be entirely explained by chance. Other writers have found that whereas the jejunum is commonly injured in its first 3 feet, the ileum is commonly injured in its last 3 feet. Unfortunately, of the ruptures of the ileum in this series the exact situation was only mentioned in three cases. In two of these it was 4 feet from the ileo-cæcal valve, and in the third 2 feet from the valve.

It is difficult to account for the frequency of lesions in the upper part of the jejunum without supposing that the small intestine, in its upper part at any rate, bears some more or less constant relationship to the vertebral column, against which it is crushed by the force applied to the abdominal wall. Mall [1] has stated that the six primary loops of small intestine occupy definite positions within the abdominal cavity, while Grégoire [2] and many other anatomists believe that this is also true of the intestine in its final state of development. It is certainly very suggestive that it is the second or third loop of the jejunum which is commonly injured at the point at which it crosses the vertebral column.

Character of the Lesion.

Of the ruptures of the duodenum, two showed complete transverse division, and all were associated with other severe injuries in the upper abdomen. In the small intestine the majority of the lesions were partial ruptures—that is, the continuity of the bowel was not completely divided, although all its coats were involved. Of the nine cases of complete transverse division, seven were in the jejunum and two were in the ileum.

It is noteworthy that, whereas all the cases of rupture of the stomach and the duodenum were complicated by other injuries, usually intra-abdominal,

those with rupture of the small intestine, with the exception of two, were uncomplicated by any such injury. The lesion was usually single. Five cases occurred in which there was a double lesion. In these the perforations were usually close together, although in one case they were separated by a distance of 5 feet. In many of the cases of multiple perforations of this kind already reported the patient has been kicked by a horse, and it has been suggested that these injuries were due to the impact of the two ends of the hoof. In only one of the five cases in this series was the injury due to a kick; in another the patient was crushed between the buffers of a train, and it is possible that the same explanation may also apply here.

The extent of the rupture is of great importance, and it is by no means impossible that small perforations should become sealed off by the adhesion of the great omentum, aided by the eversion of the mucosa so typical of intestinal rupture. The following case illustrates the possibility of this happening:—

CASE 26.—A man of 28 was struck in the abdomen by the open door of a goods van while working on the railway. On admission he complained of great abdominal pain, and the abdomen was both rigid and tender. His pulse was 66 and there was some vomiting, which continued until the following day, when it seems that his condition somewhat improved. Twelve days later he developed definite signs of intestinal obstruction and operation became necessary. On opening the abdomen it was found that the omentum had become adherent to the ileum at one point, thus forming a band which was the cause of the obstruction. The patient died, and at autopsy it was found that the bowel had been ruptured at the point at which the omentum had become attached. It is reasonable, therefore, to assume that similar cases occur in which perhaps the patients are more fortunate in escaping the dangers of intestinal obstruction. Without the complication recovery in this case might well have been complete.

Injury to the Mesentery.

The complication of injury to the mesentery is found, according to Moynihan,[3] in 10 per cent. of cases. In most cases it does not appear to influence the prognosis except when the mesentery is torn from the bowel along the line of its attachment. This condition, termed by Sencert[4] "mesenteric disinsertion," has received little attention from surgical writers hitherto, but it deserves notice, since it may profoundly modify both diagnosis and prognosis of the case in which it occurs. The following cases illustrate the possible results of this injury:—

CASE 12.—A man of 27 fell from a telegraph pole on which he was working a distance of about 50 feet. On admission the abdomen was rigid and his pulse was 96; liver dullness was normal. Within three hours there was marked pallor and the abdomen was greatly distended, suggesting the diagnosis of internal hæmorrhage. On laparotomy the jejunum was found disinserted for a distance of about 4 inches, and close to this was a small rupture of the bowel. "Several branches of the superior mesenteric artery were bleeding furiously."

CASE 31.—In this patient, a girl of 3, who had been run over by a light cart, internal hæmorrhage was not a feature of note. The patient complained of great pain and the pulse rose to 160. On laparotomy it was found that in addition to two ruptures, both of which were small, the bowel had become separated from its mesentery and was gangrenous. This necessitated resection, and the patient died.

The immediate consequence of mesenteric disinsertion therefore is hæmorrhage, which may in itself be sufficient to cause death; the more remote consequence is gangrene, which carries with it so high a mortality. Sencert,[4] in reviewing this aspect of intestinal rupture, was able to find only 30 recorded cases, but probably it is a complication far more common than these findings would suggest.

Nature of the Violence.

The cause of the injury was as follows:—

Run over	16	Kicked	2
Crushed	7	Knocked down	2
Struck by various objects	6	Fall	1

In the majority of cases the force applied was direct—that is, it compressed the anterior abdominal wall, crushing the bowel on the vertebral column. In two cases the force applied was indirect, and in each the patient was struck in the lumbar region, from where in some way the violence was transmitted to the abdominal contents. E. J. Senn[5] has reported and discussed two similar cases; in his own case a woman of 26 fell in the snow, striking her right buttock. Signs of peritonitis later appeared, and on opening the abdomen he found a small rupture of the ileum in the lower part of the pelvis. In the second case, reported by F. J. Bottomley,[5] the patient was struck beneath the angle of the left scapula and sustained a rupture of the duodeno-jejunal junction.

Cases 12 and 33 illustrate this peculiar type of injury. In the first, already referred to as showing the results of mesenteric disinsertion, the patient fell 50 feet, striking his right lumbar region and bruising the iliac crest. At operation a small perforation was found in the jejunum in addition to the injury to the mesentery, which has already been described. In the second case the patient was struck in the back by a railway engine. The lumbar muscles were severely contused, several of the lumbar spines were fractured, and there was also a fracture-dislocation of the third lumbar vertebra. It is indeed extraordinary that with such extreme violence the only resulting injury within the abdomen was a single rupture of the jejunum of no great size.

The mechanism of this type of injury is difficult to explain, and Senn came to the conclusion that it was due to "violent momentary vibrations in a coil of intestine overdistended with fluid contents." It seems that by this explanation Senn imagined that the affected coil was for the moment isolated from the segment above and below; if this is the case, however, it clearly cannot apply to the first of the above-mentioned patients, for no change affecting only the contents of a loop of intestine could possibly separate it from its mesentery. It seems more likely that trauma applied to the lumbar region causes a violent hyperextension of the lumbar column and consequently a tightening of the anterior abdominal wall. The bowel may well be crushed, therefore, in this type of injury, in exactly the same way as it is in the more usual case of direct violence.

It has already been pointed out that injury to the stomach and the duodenum was frequently associated with laceration of the liver, pancreas, or spleen, complications which patients with rupture of the small intestine usually escaped. The upper abdomen is relatively well protected by the downward projection of the thoracic wall, which covers it laterally and to a great extent in front. The contents of the pelvis are to some extent also protected by its bony walls, but not entirely so, since the pelvis is directed both upwards and forwards. It is clear, then, that the part of the abdomen most liable to injury is that which lies between these extremities; most writers on the subject agree that the dangerous area of the abdomen is that below the umbilicus, where the forward projection of the lumbo-sacral curve is most marked.

Signs and Symptoms.

In reviewing the signs and symptoms of intestinal rupture presented by the cases in this series it becomes evident that no one sign or symptom can be regarded as in any way diagnostic of the condition in its early stages. In nearly all the cases the predominating feature at the time of admission was pain, shock, or rigidity of the abdomen.

Pain.—This was very marked in most cases, and although sometimes localised was usually diffuse. Generally it appeared at the time of the injury, but in a few cases it was delayed. The pain usually increased in severity until operation was undertaken, although in one case it disappeared within a few hours of the injury. In this patient laparotomy was undertaken within seven hours of the injury, and death seems to have been due to shock.

Shock.—This was evident in the majority of cases, and was so marked in a few that it precluded operation.

TABLE I.—THIRTY-FOUR CASES OF TRAUMATIC INTESTINAL RUPTURE.

No.	Age and sex.	Dates of (a) accident, (b) admission, (c) discharge or death.	Nature of injury.	Symptoms and signs.	Treatment.	Result.	Condition found at operation or post mortem.
1	8 F	(a) 11/8/02 (b) 11/8/02 (c) 11/8/02	Run over by light van.	Abdomen rigid. Liver dullness absent. Right and left flank distended.	No operation.	D*	Rupture of stomach and upper pole of spleen. Peritonitis.
2	8 M	(a) 26/4/10 (b) 26/4/10 (c) 26/4/10	Run over by cart.	Abdomen rigid on left side. Pt. vomited blood. Pulse 120.	Laparotomy 17 hrs. after admission.	D	Rupture of stomach and pancreas. Large quantity of free blood in abdomen.
3	6 F	(a) 28/5/10 (b) 28/5/10 (c) 28/5/10	Run over by motor-car.	Abdomen rigid in epigastrium. Much pain and vomiting. Rigidity increased. Pulse rose to 120.	Laparotomy 2 hrs. after injury. Rupture sutured.	D	Rupture of stomach near cardia; 4 to 5 oz. of blood-stained fluid in abdomen.
4	7 M	(a) 28/6/20 (b) 28/6/20 (c) 2/7/20	Knock on back of head by motor-van.		No operation.	D	Fracture of base of skull. Rupture of lesser curvature of stomach.
5	5 M	(a) 24/12/02 (b) 24/12/02 (c) 24/12/02	Run over by hansom cab.	"Signs of abdominal injuries."	Operation refused.	D	Rupture of duodenum. Fracture of femur.
6	14 M	(a) 3/6/10 (b) 3/6/10 (c) 4/6/10	Run over by cart.	Much abdominal pain. Little bruising.	Laparotomy. Suture of duodenum.	D	Duodenum completely severed intraperitoneally. Fracture of spine.
7	5 M	(a) 28/9/22 (c) 28/9/22	Run over by light van.	Pt. greatly shocked. Band of bruising across epigastrium. Abdomen rigid and tender. Liver dullness at first normal, later diminished.	No operation.	D	Complete rupture of duodenum. Liver and spleen lacerated. Fracture of many ribs.
8	20 M	(a) 24/3/17 (c) 26/5/17	Crushed between pole of wagon and post.	Abdomen extremely rigid and distended; extreme pain; pulse 72; no bruising.	Laparotomy. Suture of rupture. No drainage.	R	Partial rupture at duodeno-jejunal junction.
9	9 M	(a) 6/2/02 (b) 6/2/02 (c) 7/2/02	Run over by van.	Much collapse; vomiting; pulse feeble.	Laparotomy. Suture of rupture.	D	Partial rupture of jejunum 13 in. from the duodeno-jejunal junction.
10	50 M	(a) 3/8/03 (b) 3/8/03 (c) 3/8/03	Playing with lad of 16, who accidentally sat on his abdomen.	No immediate pain. Later pt. vomited. Pulse 140. Dullness developed in left flank.	Operation refused.	D	Partial rupture of jejunum in two places, 4 ft. and 9 ft. from pylorus. Peritonitis.
11	33 M	(a) 13/9/05 (c) 14/9/05	Struck in abdomen by crane.	Much pain. Pulse 76, on following morning 108.	Laparotomy on following morning. Suture.	D	Partial rupture of jejunum just beyond its commencement. Laceration of pancreas.
12	27 M	(a) 29/9/05 (b) 29/9/05 (c) 30/9/05	Fall of 50 ft. from telegraph pole. Struck right lumbar region.	Abdomen rigid. Liver dullness normal. Pulse 96. Three hours later much distension and marked pallor. Bruise of right iliac crest.	Laparotomy 5 hrs. after admission. Suture and ligature of mesentery.	D	Partial rupture of jejunum. About 1 in. away mesentery of bowel completely separated from its attachment for 4 in. Several branches of sup. mesenteric artery bleeding furiously.
13	29 M	(a) 1/5/08 (b) 2/5/08 (c) 6/6/08	Kicked by horse.	Vomited at once and throughout the following night. Much pain. Rigidity.	Laparotomy. Suture, irrigation, No drainage.	R	Partial rupture of jejunum about 5 in. from duodeno-jejunal junction.
14	9 M	(a) 23/2/10 8 A.M. (b) 23/2/10 2 P.M. (c) 8/4/10	Crushed between two carts.	Abdomen rigid and tender. Pulse rose, 130.	Laparotomy 14½ hrs. after. Suture, drainage.	R	Partial rupture of jejunum about 18 inches from duodeno-jejunal junction.
15	21 M	(a) 30/12/15 9 P.M. (b) 31/12/15 5.30 P.M. (c) 5/2/16	Run into by barrow.	Walked to hospital. Slight bruise on abdomen which was tender and rigid. Pulse 132.	Laparotomy. Suture, drainage.	R	Partial rupture of the first part of jejunum. Much brownish fluid in abdomen.
16	30 M	(a) 25/5/99 (b) 25/5/99 (c) 27/7/99	Crushed between pole and wall.	Acute pain. Abdomen retracted and immobile.	Laparotomy 2½ hrs. after injury. Anastomosis with Murphy's button.	R	Complete rupture of the jejunum.
17	50 M	(a) 22/5/01 (b) 22/5/01 (c) 23/5/01	Hit on abdomen by piece of marble weighing 15 cwt.	Extreme pain, which later disappeared. Much shock. Rigidity.	Laparotomy 7 hrs. after injury. Murphy button anastomosis.	D	,, ,,
18	47 M	(a) 29/6/04 (b) 29/6/04 (c) 30/6/04	Crushed between two barges.	Very collapsed. Much pain. Abdomen rigid. Left side dull. Pulse 100.	No operation.	D	Complete rupture of jejunum. Rupture of pancreas. Fat necrosis. Peritonitis.
19	18 F	(a) 6/5/08 (b) 6/5/08 (c) 7/5/08	Run over by heavy cart.	Much shock. Pulse 116. Swelling of left side of abdomen due to percussion.	Laparotomy. Murphy button anastomosis.	D	Complete rupture of jejunum near commencement. Much blood in abdomen.
20	23 F	(a) 26/8/12 (b) 26/8/12 (c) 27/8/12	Run over by motor-bus.	Much abdominal pain. Vomiting.	Laparotomy immediate. Rupture not found.	D	Complete rupture jejunum. Laceration of omentum and mesentery.
21	12 M	(a) 20/10/22 (b) 20/10/22 (c) 20/10/22	Run over by lorry.	Extreme shock. Abdomen rigid and tender. Vomited a good deal of blood.	No operation.	D	Complete rupture of jejunum. Laceration of liver and pancreas.
22	29 M	(a) 12/2/23 (b) 12/2/23 (c) 14/2/23	Crushed between cart and wall.	On admission diffuse pain, no rigidity. Pulse 100. After 24 hours it rose to 120, with signs of peritonitis.	Laparotomy. Enterostomy.	D	Complete rupture of jejunum. Peritonitis and fat necrosis.
23	½ M	(a) 8/9/99 (b) 8/9/99 (c) 9/9/99	Run over by trolley.	Much pain, rigidity; liver dullness normal. On following day pulse rose to 142. Dullness developed in lower abdomen.	Laparotomy. Suture.	D	Partial rupture of ileum. Much free blood in abdomen.

TABLE I.—THIRTY-FOUR CASES OF TRAUMATIC INTESTINAL RUPTURE—(*Continued*).

No.	Age and sex.	Dates of (*a*) accident, (*b*) admission, (*c*) discharge or death.	Nature of injury.	Symptoms and signs.	Treatment.	Result.	Condition found at operation or post mortem.
24	22 M	(*a*) 4/1/99 (*b*) 4/1/99 (*c*) 5/1/99	Crushed between buffers of train.	Abdomen rigid. Much pain. Liver dullness impaired; dullness in left flank.	Laparotomy 26 hrs. after injury. Resection.	D	Partial rupture of ileum in two places 3 in. apart, about 4 ft. from ileo-cæcal valve. Peritonitis.
25	10 M	(*a*) 10/10/07 (*b*) 10/10/07 (*c*) 29/12/07	Run over by cart.	Abdomen rigid. Much pain. Bruise on right side. Vomited blood. Pulse rose to 124.	Laparotomy on following day. Suture and drainage.	R	Partial rupture of ileum in two places.
26	28 M	(*a*) 18/3/09 (*b*) 18/3/09 (*c*) 31/3/09	Struck by door of goods van.	Much pain, especially in right iliac region. Abdomen rigid and very tender. Pulse 66. Condition same on following day, with some vomiting. Pain and rigidity continued 11 days, when vomiting again started.	Laparotomy 13 days later. Omentum adherent to small rupture of ileum. Separated.	D	Omentum had become adherent to ileum, sealing the perforation but producing intestinal obstruction 12 days later.
27	42 M	(*a*) 6/1/13 (*c*) 9/1/13	Struck in abdomen by heavy weight of coal.	Abdomen very rigid. Pulse 84. Vomiting persisted and pulse-rate rose to 130.	Laparotomy. Suture.	D	Rupture of ileum for about half its width at the anti-mesenteric border. Peritonitis.
28	51 M	(*a*) 28/1/20 (*b*) 28/1/20 (*c*) 15/3/30	Kicked on abdomen.	Much pain and thirst. Abdomen rigid. No vomiting. Pulse 88.	Laparotomy 2 hrs. after admission. Suture, drainage.	R	About 2 pints of blood-stained fluid in the abdomen; two small partial ruptures of ileum about 2 ft. from ileo-cæcal valve on mesenteric border.
29	? M	(*a*) 20/4/99 (*b*) 20/4/99 (*c*) 21/4/99	Hit on abdomen by iron pipe.	Much pain, marked rigidity. Liver dullness normal.	Laparotomy on following day. Suture.	D	Complete rupture of ileum.
30	49 M	(*a*) 31/8/03 (*b*) 31/8/02	Run over (intoxicated) by brewer's dray.	Much collapse.	Operation refused.	D	Complete rupture of ileum about 4 ft. from ileo-cæcal valve. Other viscera normal. Little peritonitis.
31	3 F	(*a*) 25/10/10 (*b*) 26/10/10 (*c*) 29/10/10	Run over by light cart.	Much pain. Bruising on left side. Persistent vomiting. Pulse rose from 114 to 160.	Laparotomy. Suture. Resection and anastomosis with Murphy's button.	D†	Two small ruptures of small intestine. At one point mesentery separated from bowel, which had become gangrenous. Resection necessary.
32	11 M	(*a*) 22/7/99 (*b*) 22/7/99 (*c*) 22/7/99	Run over by cart.	Abrasion of abdominal wall. Marked rigidity. Impaired liver dullness.	Laparotomy 2 hrs. after injury. Resection of 12 in. of bowel. Anastomosis.	D	Two partial ruptures of small intestine.
33	30 M	(*a*) 4/10/04 (*b*) 4/10/04 (*c*) 4/10/04	Knocked down by railway engine.	Contusion of lumbar muscles on right side, and multiple fractures of lumbar spines.	No operation.	D	Fracture dislocation of third lumbar vertebra. The only intra-abdominal injury was one small partial rupture of small intestine.
34	26 M	(*a*) 24/7/98 (*b*) 24/7/98 (*c*) 25/7/98	Thrown from van, both wheels passing over abdomen.	Admitted with fracture of pelvis.	,, ,,	D	Rupture of anterior wall of cæcum. Fractured pelvis.

D = death. R = recovery. * 7½ hours after injury. † From obstruction by button.

In some cases, too, it seems to have been responsible for death even after an early and satisfactory operation before the onset of peritonitis.

Rigidity.—This sign was almost as constant as pain, and usually the abdomen was rigid from the onset. There is no mention in any case of persistent local rigidity.

Of the remaining signs and symptoms none were as constant as the above three, and most commonly they indicated only the onset of peritonitis. Of these latter the steadily rising pulse-rate was the most characteristic, and since this is only a relatively late indication of rupture, while pain, shock, and rigidity of the abdomen may all be present without serious intra-abdominal damage, there is no escaping the conclusion that early diagnosis is almost impossible. The surgeon must be guided more by a general consideration of the clinical picture than by the presence or absence of any particular sign.

It is commonly believed that the normal area of liver dullness is to some extent impaired in intestinal rupture, certainly in a great many cases, if not in all; it is interesting to note, therefore, that in only three of the 34 patients was this the case. In many cases, it is true, no mention is made of its presence or absence, but probably in the majority of these it was absent. On the other hand, in several cases it is definitely mentioned that the liver dullness was normal, so that little or no reliance can be placed upon its absence. Although small quantities of gas must escape from the bowel immediately after its rupture, it is unlikely that there is ever sufficient gas present, in the small intestine at any rate, to alter appreciably the relation of the liver to the abdominal wall. Such small quantities of gas have occasionally been seen in an early X ray examination of the abdomen, appearing as a localised pneumo-peritoneum, and the possibility of demonstrating the presence of free air by this means should always be considered. It is a great pity that this valuable aid to early diagnosis is not more commonly invoked in every case of doubt.

Mortality.

Of the 34 cases recorded, 3 refused operation, leaving for consideration 31. Of this number 7 recovered and 24 died—a mortality of nearly 78 per cent. The successful cases are given in Table II.

That no case of rupture of the stomach or duodenum recovered is accounted for by the fact that injury to these structures was in each case complicated by some other severe laceration, usually intra-abdominal. Of the 15 cases of injury to the jejunum, one case refused operation, and of the remaining 14 five recovered. Of the 8 cases of rupture of the ileum,

one also refused operation, and of the remaining seven 2 recovered. There does not appear to be, therefore, any great difference in the mortality of ruptures of the jejunum and ileum respectively, although it might have been supposed that the contents of the latter are usually more septic, and

TABLE II.

Case No.	Situation of rupture.	Nature of operation.	When performed.
8	Duodeno-jejunal junction.	Suture of rupture. No drainage.	Not recorded.
13	Jejunum, 5 in. from commencement.	,, ,,	"Following day."
14	Jejunum, 18 in. from commencement.	Suture of rupture. Drainage.	15 hours after injury.
15	Jejunum, high up.	,, ,,	Not stated; at least 21 hours after injury.
16	Jejunum completely severed.	Murphy button anastomosis.	2½ hours after injury.
25	Ileum, in 2 places.	Suture of each rupture and drainage.	Following day.
28	,, ,,	,, ,,	Not stated. 2 hours after admission.

Note.—By drainage is meant drainage of the peritoneal cavity.

peritonitis therefore earlier in its appearance. In all the successful cases, with the exception of one where Murphy's button was used, it will be noticed that simple suture of the rupture was the only surgical procedure necessary. In the three cases where resection was undertaken the patient died. In only one case was enterostomy performed, and in this case also the patient died.

In the successful cases the time factor, so highly significant in the perforation of a gastric or duodenal ulcer, does not appear to be of so great importance, for although in one case operation was undertaken within two and three-quarter hours of the injury, in one case it was delayed 15 hours, and in another at least 21 hours, while in a further two cases the abdomen was not explored until the following day. Regarding rupture of the small intestine as a whole, of a total of 26 cases the continuity of the bowel was completely severed in 9. Of these one refused operation and of the remainder only one recovered. Of the 17 cases in which the continuity of the bowel was only partially divided, one again refused operation, but of the remainder six recovered. It is clear, therefore, that the mortality of the second group is considerably less than that of the first, and since peritonitis does not seem to have been more marked in one than in the other, it is reasonable to assume that the shock associated with the more severe injury is very largely responsible for this disproportion.

The shock always associated with intestinal rupture, if at all severe, tends to become worse as time goes on, and offers almost insuperable difficulty in the treatment of these cases. In extreme cases the patient dies, even after an early and otherwise successful operation, while in its less severe degrees it obscures the whole clinical picture and masks the onset of peritonitis. A mortality of 78 per cent. is certainly enormous, and there can be little doubt that early exploration of the abdomen would reduce this to a considerable extent. At the same time, however, while every attempt in this direction should be made, it is doubtful whether in the present state of our knowledge a large percentage of recoveries can ever be attained.

I am much indebted to the members of the surgical staff of the hospital for their kind permission to publish these cases.

References.

1. Mall: Arch. für Anat. und Entwicklung, 1897, Supplement, p. 216.
2. Grégoire: Anatomie médico-chirurgical de l'abdomen, 1922, 85.
3. Moynihan: Abdominal Operations, 1914, ii., 68.
4. Sencert: Bull. et Mém. Soc. de Chir., 1921, xlvii., 758.
5. Senn: Amer. Jour. Med. Sci., 1904, cxxvii., 968.

A CASE OF COMPLETE DECEREBRATE RIGIDITY IN MAN,

WITH OBSERVATIONS ON VARIOUS REFLEX REACTIONS.

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IN a recent paper [11] the writer discussed the question of Sherrington's decerebrate rigidity from the point of view of its occurrence and recognition in the human subject, and expressed the conclusion that while in the spasticity of hemiplegia and of the extended form of paraplegia we have a clear example of muscular hypertonus physiologically identical with that observed in the decerebrate animal, yet, so far, clinical neurological records contain no completely satisfactory account of a case of "decerebrate man." For the most part the cases to which this diagnosis has been attached during the past two years are examples of different varieties of extra-pyramidal syndrome, or of tonic fits, none of which conditions can rightly be identified with Sherrington's decerebrate rigidity.

In these circumstances it may be of interest to place on record the following case, which is a closer approximation to the experimentally produced condition in question than any the writer has encountered in the human subject. Not only was the hypertonus physiologically identical with that described by Sherrington, but there were present Magnus and de Kleijn's tonic neck reflex and also a form of interaction between tonic and phasic reflexes, both of which are a normal accompaniment of the rigidity in animals. Further, the clinical picture was free from complication by those irregularities of respiratory and cardiac activity and by tonic fits, which are in all probability due to gross disturbances in the blood-supply of the brain stem, and are no part of true decerebrate rigidity.

The patient was an unmarried woman of 23. She was admitted to hospital complaining of blindness of sudden onset seven days previously. Up to the morning on which she awoke to find herself deprived of vision she had been at her usual work, but she stated that during the year preceding she had suffered from occasional "bilious attacks with headache," which she had not regarded seriously.

Condition on Examination.—The patient was alert, with normal intelligence, emotional tone, speech, development, and physique. There was total blindness in both eyes, no perception of light remaining in either; the discs showed intense papilloedema with commencing secondary atrophy, and the pupils were dilated and inactive, the cranial nerves being otherwise normal. The motor and sensory systems were normal. The tendon-jerks were brisk and equal on the two sides, the abdominal reflexes sluggish on both sides, and there was a bilateral extensor plantar response.

Operation.—A right-sided temporal decompression was performed, revealing a great increase of intracranial tension, but no other abnormality. A week later she was noted to have a well-marked left hemiplegia, with commencing flexor spasticity in the arm. There was considerable bulging of the scalp over the bone defect.

Course of Case.—During the second week after operation she gradually lapsed into a state of semi-coma, in which she could neither answer questions nor carry out simple orders. However, there was ample motor response of the right limbs to such stimuli as pinching or pin-prick. She remained thus for about two weeks, towards the end of which a right hemiplegia began to develop. Finally, in the fourth week complete double hemiplegia obtained. The patient lay motionless in bed. She was unable to swallow and was nourished by means of œsophageal feeds. The temperature was consistently below normal, ranging from 96° F. in the morning to 97° in the evening. The pulse was regular in force and frequency and averaged 84 per minute. Respiration was regular and unembarrassed and of a rhythm of 18. The blood pressure ranged between 130 and 140 mm. of mercury. During the last week of life the coma deepened, the tonic reflexes to be described failed, the rigidity waned, the tendon-jerks disappeared, and tonic fits, cardiac and respiratory irregularities developed. The blood pressure slowly sank during the terminal stage.

Post-mortem Examination.—A nodular mass was revealed, presenting at the base of the brain in the inter-peduncular space, and stretching and separating the optic tracts. It was strictly median in position, and on its under-surface and continuous with it was the pituitary body, which was of normal size. Median sagittal section of the brain exposed the tumour, as depicted in Fig. 1. The pituitary body was cystic and the large cavity contained in it was continuous with a large cavity in the lower portion of the growth. The tumour was sharply marked off from the brain tissue, and a fine membrane surrounded it as it filled the third ventricle. It was lobulated in structure and contained numerous small cystic cavities and calcareous masses. It clearly

FIG. 1.

Sagittal section of the brain, the mesial aspect of the left half presenting, and revealing a supra-pituitary tumour which fills the third ventricle. The cystic pituitary can be seen at its lowest part. Histologically, the growth is a myxo-endothelioma.

belonged to the well-defined group of supra-pituitary tumours recently discussed by Greenfield, Armstrong,[4] [1] and others. Histologically, also, it conformed to the description given by these authors. In addition, there was marked dilatation of the lateral ventricles. It seems probable that an acute secondary hydrocephalus was the cause of the rapid onset of symptoms in the first place, and that finally this and the pressure of a large mass in the middle line produced the effect of "decerebration" by compressing the structures in the anterior part of the brain stem and by cutting off the cerebral hemispheres from functional connexion with lower levels. The thoracic, abdominal, and pelvic viscera were all normal.

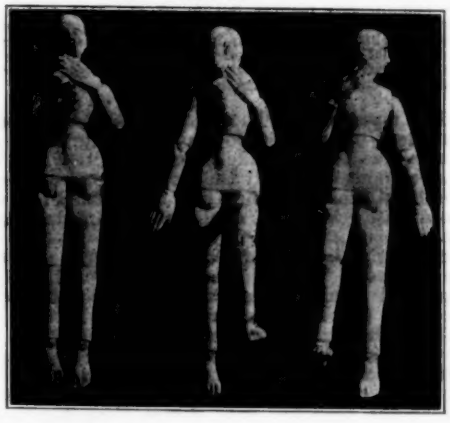
We may now pass to consider the features which led to the conclusion that the patient was a true example of decerebrate rigidity. The course of the illness may be divided into two stages for this purpose: (*a*) the stage of decerebrate rigidity, and (*b*) the stage of failing reflex activity and of tonic fits.

(*a*) *Stage of Decerebrate Rigidity.*

The patient lay motionless and unconscious on her back, with the head in the median position. There was no trace of head retraction. The arms lay across the chest, semi-flexed at the elbows, with the forearms slightly pronated and the wrists and digits flexed. The legs lay extended and adducted with the feet plantar-flexed. There was spasticity of moderate degree in all four limbs, definitely more pronounced in the arms than in the legs. In the former the flexors were concerned, in the legs the extensors (and plantar flexors). In addition to this characteristic selective incidence, the hypertonus showed all the usual features of decerebrate rigidity. Owing to its recent onset, it was extremely plastic, the limbs tending to retain any new posture passively imposed upon them. Nevertheless, on returning to the patient after the lapse of about ten minutes, they were invariably found to have resumed the initial positions above described. Passive stretching of a spastic muscle, the flexors of the forearm or the knee extensors, revealed the familiar "clasp knife" character of the spasticity and experimentally produced decerebrate rigidity, in which after the initial tonic resistance has been overcome the spasm seems suddenly to melt away.[6] [8] The tendon-jerks were all very brisk and presented the tonic prolongation typical of the "spastic" tendon-jerk. In the case of both knee- and supinator-jerks the "step-ladder" shortening of the muscle after each of a series of rhythmically elicited jerks was observed.[11] In short, all the features of decerebrate rigidity were present. The abdominal reflexes were absent, and stimulation of the sole was followed by a flexion reflex consisting of an ample Babinski plantar response, and of a rapid, short-lived flexion at hip and knee of moderate amplitude. Simultaneously, the foot and great toe of the crossed limb plantar-flexed (crossed extension reflex).[8]

Tonic Neck Reflex of Magnus and de Kleijn.—The method of eliciting this reflex and its characters in the human subject I have already described in detail elsewhere.[10] They were very facile in this subject, and obeyed the laws formulated by Magnus and de Kleijn.[5] Two assistants supported the lower limbs above the bed in an attitude of slight flexion at hip and knee, the two arms were slung from the wrist so as to lie just free of the trunk. In these circumstances the observer took the head between his two hands and rotated it to right or to left as desired. The following tonic reactions were observed. When the head was rotated so that the face looked over the right shoulder, the right arm, after a latent period of about two seconds, slowly extended at the elbow, the whole limb abducted, the forearm went into increased pronation. The wrist and digits remained immobile. The right lower limb slowly and actively extended, the foot plantar-flexing. *The left arm* (that on the side to which the occiput was directed) simultaneously went into full flexion at the elbow so that the hand came into the neighbourhood of the neck, the forearm supinated, and the wrist and digits remained immobile. The left leg moved very slightly into an attitude of increased flexion at hip and knee and the foot moved up slightly into dorsiflexion. The limbs retained these new attitudes as long as the head remained with the face looking to the right, but as soon as it was again rotated so that the face came to look over the left shoulder the relative attitudes of the right and left limbs were reversed. Slowly the right arm and leg took up a posture of flexion, while the left arm and leg slowly extended, taking up an attitude like that previously held by the right limbs. When the leg was allowed to lie extended on the bed the foot on the side towards which the face looked went into full plantar flexion. These attitudes and their relation to the position of the head are illustrated in Fig. 2 by photographs of a lay figure.

FIG. 2.



Photographs of a lay figure representing the attitude of the patient's limbs in the three positions of the head—in centre, turned to right, and turned to left. Actually, the patient's wrists and digits were flexed.

Interaction of Tonic Neck Reflex and of Flexion Reflex of Lower Limb.—Sherrington[7] has shown that tonic or postural reflexes are very readily overset by phasic reflexes—that is, by reflex movements of nociceptive character, but that the initial posture of the reacting limb is at once restored by an active return of the tonic reflex originally in possession of the musculature. Thus the extensor rigidity of the hind limb is temporarily inhibited by the flexion

reflex, but as soon as active flexion ceased the limb returns to extension by an active "extensor rebound." Further, following the momentary inhibition, extensor tone may be increased in intensity ("post-inhibitory exaltation"). Clearly the force of the rebound and the degree of exaltation will depend upon the intensity of extensor tone originally present, and under different grades of extensor tone the flexion reflex may be expected to show different characters in respect of amplitude and time relations. This is simply an expression of that interaction of tonic and phasic reflex which is a normal element in coördination. Now, in Magnus and de Kleijn's tonic neck reflex we have a method of varying the degree of extensor hypertonus at will from moment to moment, and therefore the form of the flexion reflex may be modified by head rotation. Indeed, Graham Brown [3] has found that in the decerebrate animal the active modification of the posture of the reacting limb may cause a complete reversal of the form of a reflex movement

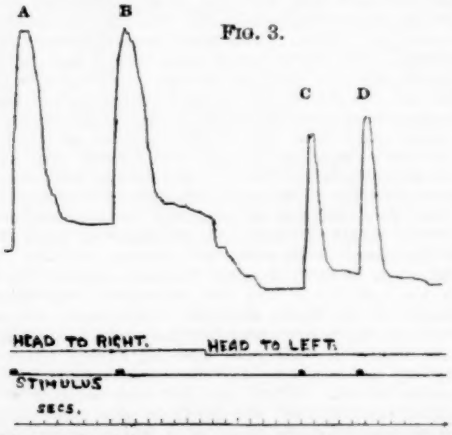


FIG. 3.

Graphic records of four successive Babinski responses elicited from the left sole; A and B were elicited with the head turned to the right—i.e., with face looking to right; C and D with head turned to the left. Upward movement = dorsiflexion, downward movement = plantar flexion. Sole stimulation, head rotation, and time are recorded below. It can be seen that spontaneous plantar flexion of the foot and hallux followed rotation of the head to the left, and that the two responses obtained with the head in this position are less ample and of shorter duration than the first two, which were obtained with the head turned to the right—i.e., with minimal extensor hypertonus in the limb.

("reflex reversal"). The present subject afforded an excellent opportunity of investigating this point, and since, as is now widely accepted, the Babinski plantar response is simply the dorsiflexion component of the flexion reflex of the lower limb of man, it may be used as an index of modifications in the flexion reflex.[11]

Accordingly the present subject showed a marked change in the plantar response when the head was rotated from one lateral position to the other. Thus when the head was rotated so that the face pointed to the right shoulder, stimulation of the left sole evoked an ample Babinski plantar response with dorsiflexion of the foot and some flexion at hip and knee. The return or extension (plantar flexion) phase of the response was slower than the active flexion (dorsiflexion) phase and was incomplete. If the head was then rotated so that the face pointed to the left shoulder, the foot plantar flexed. The plantar responses subsequently elicited were less ample than those just described and the return, or extension phase, was rapid and complete. In these circumstances the extensor spasticity of the limb was maximal, and "extensor rebound" cut short the flexion reflex and rapidly restored the initial posture of the limb. Similar examples of this phenomenon have been described by the writer elsewhere, and apart from their obvious practical interest they have a great theoretical importance. These variations in the plantar response are graphically recorded in Fig. 3.

(b) State of Failing Reflex Activity and of Tonic Fits.

During the last five or six days of the patient's life the condition we have described gave place gradually to a progressive failure of reflex activity and to deepening coma. The temperature began to swing from 96° in the morning to 101° in the evening. The pulse and respiration rates became rapid and variable. The blood pressure sank below 100. The Magnus and de Kleijn reflexes failed completely five days before death and the rigidity waned, but never entirely disappeared in the arms, which retained the posture described. The tendon-jerks disappeared and the flexion reflex on stimulation of the soles diminished in amplitude and force. Twice during the last days of the stage we have described as that of decerebrate rigidity the patient was noticed suddenly to become extremely rigid in her customary posture, and to become very red in the face. These attacks were of momentary duration. During the last week, however, they became of great frequency and intensity. The respiratory muscles became fixed, and the limbs were so rigid that no tendon reflexes could be elicited. These attacks lasted for from 15 to 20 seconds and passed off as suddenly as they developed, the patient sinking down into the bed. In the more severe ones the head retracted forcibly. A very large number of these tonic fits were noted, and doubtless many more escaped observation. They ceased entirely during the last 24 hours of life, when the patient was obviously moribund.

Comments on the Case History.

A close examination of this case history reveals but two points of defect from the complete picture of decerebrate rigidity as seen in the experimental animal. The first of these is the flexion posture of the upper limbs, the second the retention of temperature control. In earlier papers [9] the possible explanation of the flexed position of the upper limbs in hemiplegia has been discussed. It may be traced to the fact that in man the forelimbs are no longer simple locomotor props and have taken on new and highly complex functions under the influence of the cerebral cortex. In consequence we should not expect them to take up the extensor attitude of standing. Secondly, the animal after transection of the brain stem in the region of pons or medulla loses all temperature control, and, as Bazett and Penfield have shown,[2] this fact is the chief obstacle to keeping the decerebrate preparation alive for more than a few hours. It is clear, therefore, that our patient was not completely "decerebrate," and that to this fact we owe our opportunity of observing over so long a period a clinical picture identical in every other essential with experimentally produced decerebrate rigidity.

With the various theoretical considerations arising out of the presence of Magnus and de Kleijn's tonic reflexes, and of the interaction between these and the flexion reflex of the lower limb, it is not proposed to deal here, for they are discussed fully elsewhere.[10 12] Tonic labyrinthine reflexes were not sought for, since the handling of the patient which their investigation involves was not thought desirable.

A few observations on the stage of failing reflex activity may be made. It is noteworthy that it was at this stage, when the phenomenon of decerebrate rigidity was finally disappearing, that tonic fits and the respiratory and cardiac irregularities which always accompany them made their appearance. It would be difficult to find a more striking demonstration of the fundamental difference between tonic fits and true reflex decerebrate rigidity than this sequence of events provides. Lastly, a comparison of the condition observed in this patient during the stage of decerebrate rigidity with the types of muscular spasm seen in the extra-pyramidal syndromes should, if our identification of it be correct, finally dispose of the view now widely current that Parkinsonian rigidity, chorea, and athetosis can in any way be correlated with this clearly defined group of reflex phenomena.

(*Continued at foot of next column.*)

THE RELATION BETWEEN THE GROWTH-PROMOTING AND ANTI-RACHITIC FUNCTIONS OF CERTAIN SUBSTANCES.

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THE study of the vitamins during the last few years has thrown a new light on the cause of the general therapeutic value of cod-liver oil. Soon after the description of the fat-soluble A food factor by McCollum and Davis,[1] Osborne and Mendel[2] showed that cod-liver oil contains this principle. Mellanby[3] demonstrated the anti-rachitic function of some food-substances containing fat-soluble A. Zilva and Miura[4] were able to prove that cod-liver oil contains it in great abundance, namely, about 200 times as much as butter, which fact, in their opinion, was responsible also for the disparity in the therapeutic action of the two substances, especially in the prevention and cure of rickets. Soon after, McCollum, Simmonds, Shipley and Park[5] brought forward experimental evidence that the calcium depositing property of cod-liver oil was much greater than that of butter, and they advanced a theory that the calcium depositing or anti-rachitic factor and the fat-soluble A factor were not one and the same principle. It was pointed out at the time by one of us (S. S. Z.)[6] that these investigators were not taking sufficiently into consideration the great difference in the fat-soluble vitamin content of cod-liver oil and butter, and that the disparity in the anti-rachitic functions of the two substances could be equally explained by that fact. Recently many researches have shown that light can aid the promotion of growth as well as induce the deposition of calcium in bone. This parallelism also pointed to the existence of one principle. McCollum, Simmonds, Shipley and Park[7 8] have since produced further evidence in support of their hypothesis. Striking as their evidence was, it was considered that their results would have been more convincing if stricter quantitative methods had been employed, and if the growth-promoting property of the substances had been taken as a criterion of the fat-soluble A factor instead of the anti-xerophthalmic property, which, in our opinion, is not so suitable for comparative work, because it is a less constant manifestation in rats subsisting on a fat-soluble A deficient diet. However, the results recorded below tend to confirm the hypothesis of McCollum and his collaborators that the two principles are not the same, their destruction by heat and oxidation and their quantitative distribution being different.

(*Continued from previous column.*)

REFERENCES.

1. Armstrong: Three Cases of Supra-pituitary Tumour, &c., Brain, 1922, xlv., 113.
2. Bazett and Penfield: A Study of the Sherrington Decerebrate Animal, &c., ibid., 1922, xlv., 185.
3. Graham Brown: Neural Balance and Reflex Reversal, &c., Quart. Jour. Exper. Physiol., 1911, iv., 273.
4. Greenfield: The Pathological Examination of 40 Intracranial Neoplasms, Brain, 1919, xlii., 29.
5. Magnus and de Kleijn: Die Abhängigkeit des Tonus der Extremitätenmuskeln von der Kopfstellung, Arch. f. d. ges. Physiol., 1912, cxlv., 455. (See also Medical Science 1922, vii., 109.)
6. Sherrington: On Plastic Tonus and Proprioceptive Reflexes, Quart. Jour. Exper. Physiol., 1909, ii., 109.
7. Idem: The Integrative Action of the Nervous System, p. 204. London: Constable. 1906.
8. Walshe: The Physiological Significance of the Reflex Phenomena in Spastic Paralysis of the Lower Limbs, Brain, 1914, xxxvii., 269.
9. Idem: On the Genesis and Physiological Significance of Spasticity, &c., ibid., 1919, xlii., 1.
10. Idem: On Certain Tonic or Postural Reflexes in Hemiplegia, &c., ibid., 1923, xlvi., 1.
11. Idem: The Decerebrate Rigidity of Sherrington in Man, &c., Arch. Neurol. and Psychiat., 1923, x., 1.
12. Idem: On Variations in the Form of Reflex Movements, Notably in the Babinski Plantar Response, under Different Degrees of Spasticity and under the Influence of Magnus and de Kleijn's Tonic Neck Reflexes, Brain, 1923, xlvi., Pt. 3 (in press).

Experimental.

In the experiments an attempt was made: (i.) To ascertain whether the inactivation of the growth-promoting and anti-rachitic functions by heat in the presence of air proceeded at the same rate. For this purpose cod-liver oil was investigated. (ii.) To determine the quantitative distribution of the alleged two factors. For this a substance very different in character from cod-liver oil, such as spinach, was employed.

1. *Inactivation of the Growth-promoting and Anti-rachitic Functions of Cod-liver Oil by Heat and Aeration.*—In this experiment about a litre of cod-liver oil of known growth-promoting and anti-rachitic properties was heated in an oil-bath at a constant temperature of 120° C., whilst a continuous current of air was aspirated through it. Portions of the cod-liver oil were removed 6, 12, 18, and 24 hours after it had reached 120° C., and in these samples the growth-promoting and anti-rachitic properties were estimated. For the estimation of the fat-soluble growth-promoting factor the quantitative method of Zilva and Miura[4] was employed. The fat-soluble deficient diet used consisted of:—

Inactivated casein	20 g.	Decitrated lemon-juice	5 c.cm.
Starch	50 „		
Cotton-seed oil	15 „	Marmite	5 g.
Salt-mixture*	5 „	Distilled water	50 c.cm.

* McCollum,[9] No. 185.

In the investigation of the anti-rachitic property of the oils and other substances it was decided to study the preventive rather than the curative action. McCollum and collaborators based their conclusions upon a study of the curative property of the substances they investigated, and recommend it as the best method. Both methods were tried, but the preventive one was considered the more suitable for quantitive work and easier to standardise. Using macroscopical and microscopical appearance as well as calcium content of the bones as the criteria upon which to base a diagnosis, it was found, in a quantitative study such as this, to be the more reliable method upon which to base conclusions.

The rickets-producing diet employed was No. 3143 of McCollum and collaborators, which is constituted as follows:—

Diet No. 3143.

Wheat	33 g.	Sodium chloride	1·5 g.
Maize	33 „	Calcium carbonate	3·0 g.
Gluten	15 „	Distilled water†	60·0 c.cm.
Gelatin	15 „		

† Added to make a paste.

This diet is deficient in phosphorus and the fat-soluble organic factor. In another study by one of the authors (H. G.) about 150 rats, similar in origin and age to those employed in this investigation, were kept on the above diet, and, without a single exception, they developed severe rickets in four weeks. Four weeks, therefore, was adopted as the standard experimental period. Since the diet employed is low both in phosphorus and anti-rachitic factor, absolute normality of the bones could not be expected as a result of the addition to it of the organic factor only. However, in preliminary trials it was found that the administration daily of an adequate amount of cod-liver oil to rats on this diet had a profound effect on the development and calcification of their bones. Though they were not absolutely normal, yet neither grossly nor histologically did they show any resemblance to rickets. Although the rickets-producing diet employed was of different composition from the fat-soluble A deficient one used in the tests for growth-promotion, it is to be pointed out that the conclusions are based only upon the relative *rate* at which each function is destroyed by heat and oxidation, and not upon the relative *quantity* of each factor contained in the various substances.

Table I. gives a comparative description of a typical rat kept on diet 3143 for four weeks, and of one on the same diet plus a daily minimal protective dose (3·3 mg.) of cod-liver oil. The most definite and most reliable criterion for the final diagnosis was the histology, but the gross appearance and chemical analysis of the bones were of material aid in deciding the end-point in the titration of the substances. The microscopical investigation often demonstrated pathology

TABLE I.

Control rats on diet 3143 for four weeks. Severe rickets.	Rats on diet 3143 for four weeks that received daily a minimal protective dose of cod-liver oil. No rickets.
Macroscopical.	
1. Deformed chest.	1. Chest full and rounded.
2. Enlarged costo-chondral junctions and epiphyses.	2. No enlargement of costo-chondral junctions or epiphyses.
3. Very indistinct, disorganised costo-chondral line.	3. Costo-chondral lines straight and distinct.
4. Fractures of bony portion of ribs.	4. No fractures.
5. Bones very pliable.	5. Bones very much firmer than those of control, but more brittle than normal.
Microscopical.	
1. Deformity of rib near costo-chondral junction.	1. No deformity.
2. Very great proliferation of zone of provisional calcification. (25–50 layers of hypertrophic cartilage cells.)	2. Zone of provisional calcification consisting of 3–7 layers of hypertrophic cartilage cells.
3. No calcium deposit in zone of provisional calcification.	3. Moderate to very good deposit of calcium in zone of provisional calcification.
4. Disorganisation of zone of provisional calcification.	4. No disorganisation of zone of provisional calcification.
5. Wide rachitic metaphysis consisting mainly of osteoid and of uncalcified cartilage.	5. No rachitic metaphysis. Trabeculæ thin and short, but straight and well calcified.
6. Very great increase of endosteal and periosteal osteoid of cortex.	6. Only the physiological amount of cortical osteoid.
7. Callus of fracture consisting mainly of osteoid, uncalcified cartilage, and fibrous bone-marrow.	7. No fracture.
Calcium Content of Bones.	
Average % wet, 4·39. Average % dry, 11·43.	Average % wet, 6·77. Average % dry, 14·81.

not recognisable macroscopically, so that what appeared doubtfully positive protection in the gross always turned out definitely negative upon histological examination.

Including the number used for the preliminary tests 208 rats were used in this part of the investigation. For economy of space the protocols of the rats will not be included in this report. The rats were put on the rickets-producing diet at the age of from 25 to 28 days and weighing about 40 g. Two sets of controls were used in the titration of every oil: one set receiving the rickets-producing diet alone, the other the same diet supplemented by a daily dose of the crude oil known to protect against the development of rickets. The first titration of the potency of an oil was made by using quantities within wide limits—viz., 2·25 mg., 22·5 mg., and 225·0 mg. daily. If one of these doses gave protection, then the final value was determined by titrating with quantities at close intervals between the first positive result and the negative one immediately below it. In the case of the growth-promoting experiments four animals were employed for every dose, and the minimal quantity was arrived at by a similar spacing of doses.

The final values given in Table II. for the minimal anti-rachitic and growth-promoting doses of the various oils represent in every case the mean between the first definitely positive result in the final titration and the negative one immediately below it, both of which are also given in the table.

The chart compares the potency of the above oils by giving the number of minimal growth-promoting and rickets-protecting doses per gramme of every oil. It shows very well that although the initial potency of the crude oil was somewhat greater for growth-promotion than for protection against rickets, yet the growth-promoting function suffered more rapidly from oxidation at 120° C. than did the anti-rachitic function. In the specimen removed after 18 hours of heating and

TABLE II.

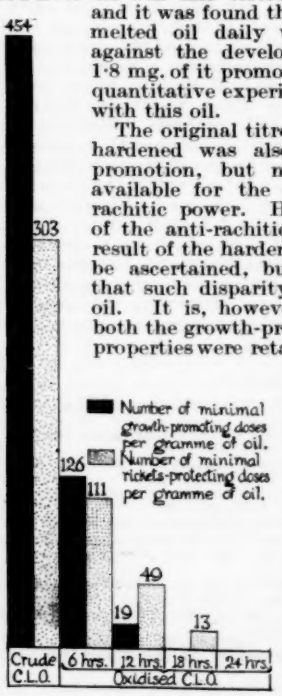
Type of oil.	Anti-rachitic function. Dose which just failed to protect.	Anti-rachitic function. Dose which gave definite protection.	Anti-rachitic function. Calculated minimal protective dose.	Growth-promoting function. Dose which just failed to promote growth.	Growth-promoting function. Dose which promoted definite growth.	Growth-promoting function. Calculated minimal growth-promoting dose.
	Mg.	Mg.	Mg.	Mg.	Mg.	Mg.
Crude cod-liver oil	2·2	4·5	3·3	1·9	2·5	2·2
Oxidised cod-liver oil—						
6 hours	6·7	11·2	9·0	6·7	9·0	7·9
12 „	18·0	22·5	20·2	45·0	56·2	50·6
18 „	67·5	90·0	78·7	450·0*	—	—
24 „	450·0*	—	—	1000·0*	—	—

* Indicates that this dose definitely failed, and that a larger dose was not tested.

aeration the growth-promoting function was practically destroyed, while the anti-rachitic power was still retained in a moderate degree. In the 24-hour specimen of oxidised cod-liver oil neither function could be detected.

For additional information a sample of hardened cod-liver oil was also tested for the two functions, and it was found that about 33·7 mg. of the melted oil daily were potent to protect against the development of rickets, while 1·8 mg. of it promoted growth. An elaborate quantitative experiment was not performed with this oil.

The original titre of the oil before it was hardened was also 1·8 mg. for growth-promotion, but no specimen of it was available for the estimation of the anti-rachitic power. How much deterioration of the anti-rachitic potency occurred as a result of the hardening could not, therefore, be ascertained, but it is hardly possible that such disparity existed in the original oil. It is, however, very significant that both the growth-promoting and anti-rachitic properties were retained in a high degree by the hardened oil.



2. *The Growth-Promoting and Anti-rachitic Functions in Spinach.*—Spinach was used as the plant source of the organic factor. The fresh leaves were ground to a paste and administered in quantities from 0·1 g. to 3·0 g. daily to rats that had stopped growing on the fat-soluble deficient diet and to rats on the rickets-producing diet No. 3143. The daily dose of spinach was mixed with a small quantity of the diet and served first. When that was consumed the rat was allowed to have the rest of the ration. The minimal growth-promoting dose was found to be between 0·1 and 0·25 g., while even 3·0 g. daily, the maximum dose which it was found practicable to administer (about 30 per cent. of the diet), did not have the slightest effect in

promoting calcium deposition. The animals that received the spinach were as severely rachitic as the controls. This result is similar to that of McClendon,[10] who found that from 0·1 to 0·5 g. of dried spinach cured ophthalmia, while it showed no evidence of affording protection against the development of rickets even when it formed as much as 75 per cent. of the daily diet. Zucker[11] also showed that an alcoholic and ether extract of spinach, while it possessed the power to promote growth, was unable to protect against the development of rickets.

Summary.

1. The growth-promoting and anti-rachitic properties of cod-liver oil are inactivated at different rates by heat in the presence of air.

2. There is a very great disparity between the growth-promoting and the anti-rachitic potency of spinach.

3. A certain sample of hardened cod-liver oil has been found to possess high growth-promoting and anti-rachitic activity.

4. The above observations give further support to the hypothesis of McCollum, Simmonds, Shipley, and Park that the anti-rachitic and the fat-soluble A factors are different principles.

To Prof. C. J. Martin we give our sincere thanks for very helpful advice and criticism during this investigation. A part of the expenses of this research was defrayed from a grant made by the Medical Research Council, to whom our thanks are also due.

Bibliography.

1. McCollum, E. V., and Davis, M.: Jour. Biol. Chem., 1913, xv., 167.
2. Osborne, T. B., and Mendel, L. B.: Ibid., 1914, xvii., 401.
3. Mellanby, E.: Jour. Physiol., 1918, lii., Proc., p. xi.
4. Zilva, S. S., and Miura, M.: Biochem. Jour., 1921, xv., 654.
5. McCollum, Simmonds, N., Shipley, P. G., and Park, E. A.: Jour. Biol. Chem., 1922, l., 5.
6. Zilva: THE LANCET, 1922, i., 1243.
7. McCollum, Simmonds, Shipley, and Park: Johns Hopkins Hospital Bulletin, 1922, xxxiii., 296.
8. McCollum, Simmonds, Becker, J. E., and Shipley: Jour. Biol. Chem., 1922, liii., 295.
9. McCollum: Jour. Amer. Assoc., 1917, lxviii., 1379.
10. McClendon, J. F., and Shuck, C.: Proc. Soc. Exper. Biol. and Med., 1923, xx., 288.
11. Zucker, T. F.: Ibid., 1923, xx., art. 2141.

PRENATAL CARE AND PUERPERAL MORTALITY.*

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THE remarkable fact that there has been no appreciable reduction in the maternal mortality of childbirth during the last 50 years is capable of two possible explanations: either obstetric medicine has made no progress or the modern advances are not in general use. The first suggestion is obviously untrue, for no one can doubt that valuable additions have been made to the treatment of the disorders and complications of pregnancy and the conduct of difficult labour, and it can easily be shown that these advances are competent to reduce the puerperal mortality if and when they are properly employed. But it has not yet been realised that modern methods are essentially preventive methods, and that to be successful they must be initiated during the prenatal period. Thus, the early prophylaxis of the toxæmias, contracted pelvis, and puerperal sepsis gives almost uniformly good results, whereas the latter continue to be disappointing if treatment is delayed until the disease or mechanical difficulty has reached an advanced stage.

* A paper read before the Liverpool Medical Institution.

But it is absurd to argue that modern methods have failed because the mortality is still high in cases of convulsive eclampsia, ruptured uterus, or puerperal septicæmia; on the contrary, such dangerous complications are almost impossible if prenatal care is exercised, and therefore the development of such advanced lesions is per se strongly suggestive of the neglect of modern methods. Some degree of failure to recognise and treat warning prodromata is inevitable so long as midwives continue to supervise from 50 to 75 per cent. of all pregnancies, and while the general public remain indifferent, if not hostile, to routine prenatal work; but the very inadequate training of medical students and the exigencies and established usages of general practice are also responsible factors.

As a direct consequence the general practitioner is commonly compelled to undertake the treatment of obstetric difficulties in emergency without adequate assistance and often under grossly unsuitable conditions; or the case is admitted to hospital after unsuccessful interference at home, sometimes in extremis, or at least under circumstances highly "suspect" and dangerous, and which, in spite of the resources of hospital technique and equipment, may completely discount the value of otherwise safe and effective treatment.

Attention has already been drawn to the subject in a report on Maternal Mortality published by the Local Government Board in 1915. After an exhaustive inquiry the following conclusions were expressed:—

(1) The majority of deaths are caused by puerperal fever, hæmorrhage, and convulsions, most cases of which are well within the range of preventive medicine.

(2) Local differences in total mortality are in the main caused by differences in availability of skilled assistance when needed during pregnancy and at and after childbirth.

(3) Puerperal fever has been substantially eliminated from lying-in hospitals, but otherwise there is a remarkable uniformity in its distribution.

Papers on this subject have usually been written from the hospital standpoint, and fail to recognise, and therefore neglect, the totally different and much more difficult conditions of general practice. Many suggested remedies are impracticable because they cannot be applied to the majority of cases. Admittedly it is impossible to produce uniformity of skill and technique, just as it is unnecessary to provide so-called surgical surroundings for ordinary uncomplicated labour; but it is neither unreasonable nor impracticable to demand that abnormal pregnancy and complicated labour should be diagnosed as quickly and treated as carefully as other major surgical emergencies. Prenatal care is the only method of attaining this object, and fortunately a simple one, for its elementary principles are not beyond the powers of the average midwife, and its teaching can be applied as easily in general as in hospital practice; and not until this method is universally adopted can any serious reduction of the puerperal mortality be effected. To support this contention it is necessary to demonstrate three groups of facts: (1) the causes of death in childbirth; (2) the extent to which these morbid processes are associated with recognisable warning symptoms during pregnancy; (3) the proof that such prodromata are largely amenable to preventive treatment.

Causes of Maternal Death in Childbirth.

At Brownlow Hill Infirmary, Liverpool, since 1880 there have been 159 deaths amongst 14,000 cases delivered in the maternity wards. The causes of death were generally determined by autopsy, and may be classified as follows:—

Puerperal Sepsis (53).—Septicæmia, 18; septicæmia and syphilis, 6; septicæmia and gonorrhœa, 1; peritonitis, 16; septic pneumonia, 5; erysipelas, 2; cellulitis, 1; phlebitis, 1; salpingitis, 2; pyelitis, 1. (*a*) Most of these labours were instrumental or otherwise complicated. (*b*) Patients belonged to the lower strata of society and showed a high incidence of venereal infection. (*c*) Modern control of

sepsis in hospital is shown by the following figures: 1880–90, 30 deaths; 1890–1900, 13 deaths; 1900–10, 7 deaths; 1910–20, 3 deaths. (*d*) The many different types of fatal sepsis shown emphasises the importance of honesty in diagnosis and suggests that if accurate notification became general the amount of puerperal infection would exceed the high figures now apparent.

Hæmorrhages and Accidents (26).—Post-partum hæmorrhage, 8; post-partum hæmorrhage and sepsis, 4; ante-partum hæmorrhage, 4; placenta prævia, 4; ruptured uterus, 5; craniotomy (shock), 1.

Toxæmias (17).—Jaundice, 1; albuminuria (nephritis), 2; eclampsia, 14.

Intercurrent or Pre-existing Organic Disease (63).—Pneumonia, 12; bronchitis, 11; phthisis, 17; heart disease, 9; typhoid fever, 3; meningitis, 2; cerebral abscess (latent before delivery), 1; cerebral tumour, 1; insanity (hunger strike), 1; scarlet fever, 1; irritant poison and alcoholism (coroner's inquests), 1 each; carcinoma of cervix, 1; cancer of liver, 1; tuberculosis of kidney, 1. In a few of these cases pregnancy played a small and insignificant part in producing the fatal result: in a larger number parturition was the dominant factor and the essential cause of death. It is clear that the association of conception and independent organic disease may lead to the formation of a vicious circle of a most dangerous type, and that all such cases require early and vigorous prenatal treatment.

At the Liverpool Maternity Hospital in four recent years there have been 63 deaths amongst 2934 consecutive cases, of which 1239 were complicated.

Hæmorrhages and Accidents (26).—Accidental hæmorrhage, 13; placenta prævia, 4; post-partum hæmorrhage, 1; craniotomy (shock), 1; ruptured uterus, 5; incarcerated retroverted gravid uterus, 2.

Toxæmias (24).—Eclampsia, 21; toxic vomiting, 3.

Intercurrent or Pre-existing Disease (10).—Heart disease, 5; pneumonia, 3; embolism, 1; appendicitis, 1.

Sepsis (3).—Pyelitis, 1; peritonitis following Cæsarean section, 1; septicæmia (associated with a septic prolapsed uterus), 1. Note that during this period of four years 88 deaths were notified in the city of Liverpool as due to puerperal fever, and that very few of them occurred amongst patients delivered in hospital—i.e., the majority occurred amongst women delivered in their own homes.

Puerperal deaths therefore fall into four groups: (1) Sepsis, commonest among women delivered at home. (2) Hæmorrhages and accidents, commonest in maternity hospitals. (3) Toxæmias, commonest in maternity hospitals. (4) Intercurrent or pre-existing organic disease, commonest in Poor-law hospitals.

Amount of Prenatal Care received by 60 Fatal Cases at the Liverpool Maternity Hospital.

A brief reference to this series will not only disclose the extent to which preventive measures were employed (or neglected) in these particular cases, but will serve as a rough standard of the present development of prenatal practice.

Toxæmias.—Eclampsia: All the 21 fatal eclamptics were brought into hospital after the onset of convulsions; five only had any sort of preventive treatment. One attended the out-patient department but persistently refused to come into hospital, although pressed to do so. The second had symptoms for six weeks and called in her doctor five days before the fits commenced. The third had symptoms for two weeks and treatment at home for two days. The fourth attended the out-patient department, was admitted after delivery with post-partum eclampsia, and died four weeks later from septic endocarditis. The fifth was the only case to develop eclampsia whilst under treatment—at the rest home attached to the hospital—a fulminant type who died 19 hours after the first fit.

Sixteen patents had no preventive treatment whatever, they were admitted (on an average) 10½ hours after the first convulsion, and 15 women died within 12 hours of arrival. An analysis of 142 Liverpool cases of eclampsia presented to the British Congress of Obstetrics, 1921, showed that only 20 (less than 14 per cent.) had received any attention prior to the onset of convulsions.

Toxic Vomiting.—Three deaths; all three fatal cases were ill for several weeks without seeking advice, and died two, three, and nine days respectively after admission to hospital.

Accidental Hæmorrhage.—Thirteen deaths. As two women died within two hours and eight women within four hours of admission, the previous history of many of these cases was incomplete; but only one patient had been attending the out-patient department of the hospital before the onset of bleeding. In most cases, however, the onset of the fatal bleeding was sudden and without warning symptoms.

Placenta Prævia.—Four deaths. All these patients had warning bleedings which they ignored, and were admitted to hospital more than 24 hours after the onset.

Post-partum Hæmorrhage.—One death. This case is an extreme example of the widespread ignorance and indifference of the patients themselves. The woman was a 12-para, who, in spite of a series of hæmorrhages at former labours (A.P.H. once, P.P.H. twice, and adherent placenta three times), had neglected to engage a midwife, much less consult a doctor. Skilled assistance was not obtained until after delivery, and then only after the onset of alarming bleeding. She was moribund on admission to hospital and died 50 minutes later.

Accidents of Pregnancy and Labour.—Nine deaths. Craniotomy for dystocia: One case, dying on admission from shock and hæmorrhage, the result of the repeated and unsuccessful application of forceps to a patient with unsuspected deformity of the pelvis. Ruptured uterus: Four cases, none of them associated with toxæmia or previous Cæsarean section. All had occurred before admission, and were due to the traumatic rupture of healthy uterine muscle—the end-result of obstructed labour. There had been no preliminary or prenatal examination in any of these cases; the warning signs were therefore unrecognised, and the adoption of modern methods was fatally postponed.

Incarceration of Retroverted Gravid Uterus.—Two deaths. On admission one patient gave a history of two weeks' severe dysuria, the other seven days' anuria. Neither had received any active treatment before arrival at hospital.

Intercurrent or Pre-existing Organic Disease.—Ten deaths: Heart disease, 5 (partial prenatal treatment in two cases, none in 3); pneumonia 3, embolism 1, appendicitis 1. (It cannot be claimed that prenatal care would have prevented the fatal result in the last five cases.)

It is not intended to suggest that puerperal mortality will completely disappear when the adoption of early treatment is general; but there is no doubt that the majority of puerperal fatalities belong to the class of preventable diseases, and therefore the maintenance of the present high puerperal death-rate is primarily due to the neglect of the principles and practice of preventive medicine.

Scope of Preventive Methods in Abnormal Pregnancy and Difficult Labour.

Development of Toxæmia.—**In four-fifths of all cases of eclampsia there are prodromal symptoms, either headache, œdema or albuminuria, which may be present for an indefinite period before convulsions appear; the latter are frequently heralded by other warnings, notably abdominal pain, vomiting, and disturbances of vision. Occasionally there appear to be no danger signals—some patients feel well and have large (i.e., pathological) appetites—but even here a silent or symptomless albuminuria usually precedes the toxic storm. It is no exaggeration to say that persistent albuminuria is as significant in the pregnancy of a primipara as the association of muscular rigidity and abdominal pain in the diagnosis of peritoneal infection. After the development of convulsions the outlook is always serious, for not only has valuable time already been lost, but the disturbance entailed by transit to hospital has a very unfavourable effect on the prognosis of such cases. Sometimes massive cerebral hæmorrhage, which may be an early or even initial disaster whenever the threshold of the convulsive stage is reached, will at once destroy all hope of successful treatment. Although malignant types do occur, it can be stated with confidence that some warning is usually given and that if the urine of all primiparæ were examined regularly—if the albuminuria of pregnancy were a notifiable disease and the necessary hospital accommodation available—the convulsive or dangerous stage of eclampsia would become rare and the mortality negligible. When albuminuria is detected—contamination being eliminated—the patient must be kept under observation, because sudden fluctuations in the albumin content, changes in the blood pressure, diminution in the quantity of the urine or the appearance of abnormal constituents, such as acetone, &c.,**

may call for intensive treatment and perhaps the termination of pregnancy. The opinion of the late Dr. J. W. Ballantyne—the acknowledged pioneer of prenatal research—was expressed in the following statement made at the British Congress of Obstetrics in 1922:—

"Of 800 expectant mothers, albumin was found in 254 cases. All the patients save one received preventive treatment—the one who had no preventive treatment developed eclampsia. He almost implored her to stay in hospital, for her labour was due in a few days, and the distant and near danger signals were present. The woman obstinately determined to go home—and returned with eclampsia. She was the striking exception which, in his opinion, abundantly proved the rule—the rule being preventive measures prevent eclampsia."

Dr. Eden quotes Prof. Couvelaire as saying that eclampsia has almost disappeared at the Clinique Baudelocque, Paris, and that he attributes this to the fact that the midwives are compelled to carry out regular examinations of the urine.

Mechanical Accidents of Labour.—Most catastrophes such as ruptured uterus and obstructed labour are the result of malpresentation of the child or bony deformity of the mother; their shadow is plainly visible during pregnancy to all who study prenatal diagnosis, and their successful treatment is one of the greatest achievements of preventive medicine.

No pregnant woman, primipara or multipara, should be submitted to the risks of labour without a careful consideration of her pelvis in relation to the size, lie, and presentation of the child; such routine examination, which is comparatively simple, will differentiate all pregnant women into three groups: (1) Grossly abnormal, major degrees of pelvic contraction, uterine tumours, organic heart disease, severe albuminuria. (2) Doubtful, minor degrees of contraction, bad obstetric histories—e.g., stillbirths, ante- and post-partum hæmorrhages, &c. (3) Normal.

The first group clearly requires hospital treatment or the equivalent; the second demands special supervision during the later weeks of pregnancy; whilst the third (by far the largest group) may be left with safety to deliver themselves at home. Under such conditions dystocia will disappear, perforation and the use of the cranioclast will become rare and will only be carried out under surgical surroundings on dead babies or monsters, and the unjustifiable application of high forceps with its attendant morbidity and stillbirths will be replaced by induction of premature labour or formal and safe Cæsarean section.

Prodromata of Hæmorrhage. — Placenta prævia usually gives warnings (slight bleedings in the eighth month), occasionally, however, a solitary bleeding is rapidly fatal. The same may be said of accidental hæmorrhage if one excludes the concealed type, which is almost invariably acute in onset and but rarely associated with prodromata. The majority of these concealed bleedings are seen in multiparæ (82 per cent. of the late Gordon Ley's series), and are toxic in origin; 84 per cent. of cases are associated with albuminuria, but it has not yet been determined whether the appearance of albumin precedes the bleeding or is merely coincident with it. It is hoped that further research will reveal the source and nature of the toxin and facilitate the diagnosis of the initial stages of the disease. All that can be said at present is that the pale, flabby multipara of many pregnancies is a potential bleeder, and that the appearance of albumin is of special significance in such cases.

Intercurrent or Pre-existing Organic Disease.—The relationship of pregnancy to independent organic disease has not yet received the attention it deserves, although it is well known that the process of reproduction has a profound influence on many morbid states in which the pregnant uterus may become a serious menace to life. In heart disease, for example, pregnancy taxes the reserve power of the heart, labour entails a strain which may be immediately or more remotely fatal, and embolism or persistent cardiac debility may follow an apparently successful delivery. To many of these patients the pregnant uterus is not a physiological but a malignant tumour, and it is the object of preventive research to determine the circumstances in which it is advisable and advantageous (in effect, a live-saving measure) to terminate pregnancy and prevent future conception. Of the five cardiac deaths mentioned in this paper, four occurred in multiparæ with 3, 9, 10, and 15 previous pregnancies. It is not unreasonable to think that if Cæsarean section and sterilisation had been carried out during one of their former pregnancies, the lives of these women might have been greatly prolonged.

Prevention of Sepsis.—The anatomical surroundings of the birth canal make antisepsis difficult and asepsis impossible, and it has indeed been shown that organisms are present in the vagina and even uterus after normal labour and during an afebrile puerperium. As the deeper tissues and blood-stream are easily accessible through small lacerations or through the placental site, which always offers a large venous and lymphatic portal of entry, it is a matter for surprise that dangerous infection is not more common. The natural defences, which must be extraordinary, are quite adequate to deal with natural delivery in the absence of gross contamination, and it is well known that the born before arrival invariably does well if the labour is otherwise normal. Of 28 cases born before arrival at hospital recently it was noted that the clothes of all the patients were offensively dirty, and that no personal preparation of any kind (skin, bowels, &c.) had been made: Fourteen women were delivered on arrival at the receiving room before any cleansing was possible; seven children were born in the street (in two cases the mother separated the child herself and walked a considerable distance to the hospital); three births took place in the ambulance, three in taxicabs, and one in a cookshop. In spite of these septic external surroundings every one of these women did well and the puerperium was afebrile in each case.

These results indicate that if labour is terminated naturally and without interference the external surroundings are relatively unimportant and the chances of auto-infection remote. The possibility of auto-infection cannot be denied, for it appears to be the only explanation of certain cases, but apart from these rare exceptions, puerperal fever is the result of infection from without.

One simple vaginal examination, if carelessly performed (with or without gloves), may carry virulent organisms from the ano-perineal skin with disastrous results. Repeated examinations are always risky, however careful one may be, and the risk increases with the amount of interference, from the application of forceps and versions to the manual removal of adherent placentæ, which is perhaps the most dangerous operation in ordinary midwifery.

Examination during pregnancy and just before term is not only perfectly safe, but will reveal most cases in which interference is likely to be required, so that suitable preparations can be made at home or the patient transferred (before labour) to hospital. In either case obstetric operations can be carried out deliberately, with surgical technique, proper assistance and equipment, and consequently with a minimum of risk of infection. The practice of pre-natal care will undoubtedly reduce the incidence of puerperal infection by limiting the number of obstetric operations undertaken as emergencies in patients' own homes, for it is these emergency conditions which are chiefly responsible for the development of puerperal sepsis.

Conclusions.

1. The majority of maternal deaths in childbirth are preventable by modern prenatal methods.

2. The majority of pregnant women receive no prenatal examination, and are therefore deprived of the advantages of modern treatment.

THE DIATHERMY TREATMENT OF GONORRHŒA IN WOMEN.

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IT has long been recognised that the treatment of gonorrhœa in women is very difficult to carry out successfully, and that the results are far from satisfactory; the fact that the gonococcus can spread by the vagina to the uterus and Fallopian tubes, and produce a general infection, renders the disease more difficult to cure in the female than in the male. Metastatic gonorrhœa occurs equally in both male and female, but the infected parts in the female are so difficult of access that local treatment is, in the majority of metastatic cases, only palliative; consequently the infected joints, &c., are not so easily treated as in the male, where the local condition can be successfully dealt with.

The usual condition found on examining a female with acute gonorrhœa is that there is a discharge from the urethra and cervix, and that the latter is eroded to a greater or less extent. The discharge from both contains pus and gonococci. From the os uteri the discharge varies; at first purulent, it later tends to become muco-purulent and ropy. It is in this condition that one sees most of the cases, and in the subacute or chronic stages, when the detection of the gonococcus is very difficult. If an acute case, the treatment of the urethra by lavage with sounds and urethroscopic treatment to follow will usually clear up the condition, but at the cervix uteri the latter is very persistent; treatment with the various medicated packs and tampons apparently produces little result, and the condition goes on until the chronic stage is reached, this state of affairs occurring even in cases restricted to bed.

Limits of Temperature Favouring Growth of Gonococci.

The hopelessness of the condition generally, and the fact that we had treated some cases of gonorrhœal arthritis with marked success, made us reason that something might be done in the actual treatment of the local condition with diathermy. It appeared obvious that as heat kills the gonococcus easily in culture, it only requires sufficient heat to kill it in the tissues; as diathermy would produce heat to the necessary extent, the idea would be to heat the cervix to such a temperature as would destroy the germs without burning the cervix. Georges Luys states that in culture the gonococcus can grow between 32° and 38° C., and that six hours at 40° will kill it. Below 30° C. colonies show no growth and tend to die at 18° C. Auguste Lumière and Jean Chevotier, however, showed by their experiments that the gonococcus was even more resistant to cold.

Experiments carried out at the Military Hospital, Rochester Row, demonstrated that half an hour at 104° F. (40° C.) is a lethal dose for the organism. There is much discrepancy in these results. From our observations in the treatment of gonorrhœa by diathermy we conclude that a minimum temperature of 104° F. is necessary, and if that temperature is not exceeded it must be maintained for about an hour. These conclusions were arrived at in the treatment of men, in which cases the intra-urethral temperature of both the anterior and posterior urethra was taken every five to ten minutes, and in cases in which gonococci disappeared and were cured the temperature of every part of the urethra was not on an average maintained at 104° F. for longer than one hour.

Much higher temperatures can be attained and maintained in the female organs, from the fundus of the uterus to the urethra and external genitals, than in the male urethra. Gonorrhœa is easier to treat by diathermy in the female than in the male on this account, when the disease is confined respectively to these parts.

Technique.

In order to follow the technique of the treatment it is necessary to understand the physical properties of diathermy, and to dissociate it entirely from conducted and radiated heat. The tissues are very bad conductors of heat; for this reason it would be impossible by conducted heat to maintain the temperature necessary to effect a cure in the submucous tissues which have been penetrated by gonococci without burning severely the superficial columnar epithelium. By diathermy the superficial and deep parts can be equally heated; for it is penetrating, it passes through and through from one electrode to another, and is therefore ideal for the purpose. The amount of heat generated and maintained in any part under treatment does not entirely depend on the amount of current used, but on several other factors, one of the most important being the vascularity of the part. The more vascular the part the quicker the heat is carried away. The part of the body between the diathermy electrodes may be compared to the furnace of a radiator system.

The tissues are raised in temperature, and the fluid passing through the heated tissues is constantly carrying away heat, thereby reducing the temperature between the electrodes, and raising the general temperature of the body. It will be realised that any technique that retards the flow of blood through the part treated will raise the temperature of the part; this may be done by pressure of the electrodes, or compression of the vessels above or below the electrodes. The size of the active electrode exerts a powerful effect on the local temperature.

The two electrodes used in the treatment are of different sizes, the larger being the indifferent, while the smaller is the active electrode; the smaller the active electrode the greater is the concentration of heat around it. By reduction of the size of the active electrode a stage is finally arrived at when coagulation of the tissues takes place around it. The diathermy then becomes surgical. (For physical qualities of the current see THE LANCET, 1922, ii., 1316.) We have made various alterations in the shape and measurements of the active electrode; a cylindrical electrode three-quarters of an inch long and one-eighth of an inch in diameter, with rounded end, will, we think, be found the most convenient active electrode to use when the disease is a gonorrhœal cervicitis and endometritis. The circular discs should vary in size; the largest size that can be introduced through the speculum should be used. The larger the active electrode the better control can be kept on the temperature of the cervix and uterus, and the less likelihood is there of burning the mucous membrane.

Treatment of Gonorrhœal Endometritis, &c.

Presuming the case to be one of gonorrhœal endometritis, cervicitis, and urethritis, the treatment is carried out in the following manner. The patient having already been douched and placed on the couch in the lithotomy position, the indifferent electrode measuring 20 × 10 cm. is wrapped in a thick pad saturated in hot saline solution, and fixed by means of a binder on the abdomen as near to the pubes as possible. The cervix, os uteri, and urethra are cleansed with swabs. As large a speculum as possible is now introduced; in multiparæ a Haig Fergusson has generally been used, but in nulliparæ a Cusco has been found convenient.

The active electrode is screwed on to the holder and passed down the speculum; the stem of the active electrode is introduced into the os uteri with care, and the circular disc is then pressed gently against the cervix. Before the current is applied the speculum is slightly withdrawn to avoid contact with the active electrode. No overlapping of the vaginal wall should take place, the circular disc of the active electrode being kept in view throughout the treatment. The current is gradually increased, the temperature

which it is desired to maintain is 107° F. It is, unfortunately, impossible to lay down any hard-and-fast rule as to the amount of current to be used; this will depend on the factors already discussed. All that can be said as a guide is that the amount of current usually necessary will vary from ¾ to 1 ampère.

The sensation of heat felt by the patient is not a good guide, as from our experience of these cases the cervix is peculiarly insensitive to heat; a superficial burn may occur without the patient suffering any discomfort. The temperature of the os was taken before the treatment commenced and was found to be on the average 99·2° F. The temperature after treatment of five to ten minutes varied from 102° to 112° F., and the difficulty of getting a correct temperature during the operation became evident.

We have now designed a combined active electrode and thermometer, which it is expected will give a constant indication of the temperature of the heated part. It would be advisable for those without experience of this operation to take the intra-uterine temperature every five minutes. Although a superficial burn of the cervix heals readily, it must be borne in mind that future treatment is held in abeyance until the part is normal again. The ordinary clinical thermometer must register within half a minute, and must be introduced into the os very quickly if the correct rise is to be registered, as the part is so vascular that the temperature drops to normal very rapidly when the current is cut off.

Treatment of Gonorrhœal Urethritis.

To treat gonorrhœal urethritis the indifferent electrode is drawn well down to the pubes; after lavage and swabbing of the urethra an active electrode which consists of a cylindrical metal rod five-eighths of an inch in diameter and of convenient length is introduced to the extent of 2½ inches into the vagina and pressed in an upward direction against the vestibule and urethra. More current will be required than for the treatment of the cervix—usually about 1½ ampères is sufficient to maintain the intra-urethral temperature at 106° F. The treatment is given for ten minutes and repeated five or six times when a cure should be effected. Smears should be taken the day after each treatment. No diathermy electrode should be introduced into the urethra on any account; the necessary lethal temperature can be attained with ease without this expedient, and all chance of a burn of the urethra avoided.

As in the case of the urethra, the duration of treatment to the cervix and uterus should be for ten minutes, provided that the temperature is maintained throughout at an average of 107° F. The results of diathermy are marked; the cervical erosion heals rapidly, the discharge becomes less, and gonococci gradually disappear from the smears. With a continuation of treatment the muco-purulent ropy discharge disappears, and quite clear mucous secretion, without any gonococci in either smear or culture, is then left. Some of our cases were treated in hospital and others as out-patients; they did equally well. It is not necessary to admit cases unless they get burnt.

Diathermy Burns.

It may be necessary to explain that the burn which has been mentioned several times in the course of these observations differs entirely from an X ray burn, or the burn which originates from the electrode of a galvanic battery. The latter are sometimes most difficult to cure. Most surgeons are now familiar with the wound caused by surgical diathermy. The burn which has occurred in some of the cases is a very superficial surgical diathermy coagulation, and there has been no difficulty, in spite of the previous infection, in obtaining complete healing. We strongly advocate team work in this treatment. The technique of diathermy can only be acquired by long practice, while the selection of cases suitable for treatment, their observation, general treatment, and the verdict as to establishment of cure, are matters best dealt with by an expert in venereal diseases.

Reviews and Notices of Books.

THE MEDICAL PROFESSION IN INDIA.

By Major-General Sir PATRICK HEHIR, K.C.I.E., C.B., C.M.G., I.M.S. London: Henry Frowde and Hodder and Stoughton. 1923. Pp. 139. 7*s.* 6*d.*

Patrick Hehir began his medical study in the Calcutta Medical College and finished it in Edinburgh and at Guy's Hospital. He spent the greater part of his active life in India, filling every sort of medical appointment in military life and many in civil life, including lecturing on various subjects, health officer to a large municipality, general practitioner, and consulting physician. Since his right to speak with knowledge on the position of medicine in India is combined with discernment and a rare sense of values, his book will appeal to all who take an interest in the medical services of India or in the advancement of medicine in that great country.

The author regards the present situation as critical, for the Indian Medical Service has lost its attraction for young graduates of the home medical schools, while the deficiencies in Indian medical education have not yet been made good. The entire environment of the medical student in the United Kingdom is more salutary and invigorating than it is in the Indian colleges where the student is not taught from nursery days onwards how to make things for himself and where written examinations loom very large. While there are probably not more than a few dozen Indians with the qualifications necessary to fill professorial chairs, there were until lately hundreds of officers of the I.M.S. qualified to do so. For this reason no exception can be taken to Rule 12 of the Devolution Scheme under which the India Office has reserved 305 civil posts for officers of the I.M.S., 240 under local governments, and 65 directly under the Government of India. Medical education in India has its good points, but it is gravely behind in the ancillary subjects—pharmacology, physiology, bacteriology—and training in midwifery cannot be compared with that at home. There are no fever hospitals or hospitals for special regions, or for skin diseases, and, most surprising of all, there are no dental schools or hospitals whatever in the country.

This is the base of the position on which Sir Patrick Hehir writes his book. He gives a bird's-eye view of medical education in India, a business-like account of the Government medical services, and a description of the independent medical profession in India which is highly challenging. On the British basis of one doctor to every 1100 persons, some 250,000 independent practitioners could be utilised in India, whereas, when the Medical Registration Act came into operation in 1913, as far as could then be ascertained there were about 1770 independent medical practitioners holding registrable qualifications. Sir Patrick Hehir marvels at the small recognition by Indian philanthropists of the needs of medicine and hopes to see some of the great wealth of India diverted in the direction of more hospitals and medical schools. He will not have it that officers of the I.M.S. have been encroaching on Indian private practitioners. Everything, he says, points to the reverse, but he would like to see the house appointments at college hospitals thrown open to the successful students of the year irrespective of whether they intend to enter Government service. The Indian Government is the only civilised government in the world which provides for the medical and surgical wants of the entire population and the education of practically the whole medical profession in Western medicine; the time has come for the people to do things for themselves.

A chapter on public health work in India makes it clear that the sanitary work of the Indian army has been one of the best parts of our administration. Sir Patrick Hehir would make it possible for natives of India to obtain a diploma in public health and instruction in tropical hygiene without recourse to

the United Kingdom. The unpopularity of the public health department with I.M.S. officers owes its origin to the drudgery of their life, the absence of executive powers, and of scope for genuine ability. But although the hygienic conscience of large towns is awaking, Western sanitation has not yet been grafted into the routine life of the people, and no preventive measures will succeed until the coöperation of the people has been obtained. The unparalleled apathy of the native Indian in face of plagues and famines still remains.

In his concluding chapters Sir Patrick Hehir deals with the Oriental systems of medicine and with the medical work of women in India. He notes the increasing tendency for the women of India to take up medicine as a profession, although at present there are no Government appointments for women doctors and prospects in private practice are not alluring. There is evidence of thought and applied knowledge on every page of this book which makes it an indispensable work of reference for Indian medical study and practice.

SURGICAL DISEASES.

The Pathological Physiology of Surgical Diseases. By Prof. Dr. FRANZ ROST. Translated by STANLEY P. REIMAN, M.D., Chief of Pathological Department of the Lakenau Hospital, and Assistant Professor of Experimental Pathology, University of Pennsylvania. London: Stanley Phillips. Philadelphia: P. Blakiston's Son and Co. Pp. 535. 30*s*.

THIS book gives an account of the normal physiology and the pathological functioning of the different systems of the body when they have been damaged by injury or disease. It is a good compilation ably presented. The author says that the object of his book is to train the student "intellectually" as well as "mechanically" in the art of surgery. This is the accepted modern view of surgical education and the object of the successful attempts to introduce the physiologist and anatomist to the wards. The laborious task of translation has been well done. The book is too good to have a title made up of such a curious combination of contradictory terms.

OPERATIVE SURGERY.

Chirurgie de la tête et du cou. Précis de technique opératoire. Sixth edition. By CH. LENORMANT and PIERRE BROCQ. Prosecteurs de la Faculté de Médecine de Paris. Paris: Masson et Cie. 1923. Pp. 338. Fr.12.

THIS is a précis of operative surgery intended both for students and for medical men in general practice; the latter, according to the preface, should be able to perform any of the operations described in the book. We should imagine that few general practitioners in this country would care to attempt such formidable operations as removal of the upper jaw or the exposure of the pituitary fossa. Many who would have the necessary skill would be unable to use it with advantage in such unusual circumstances. The book is more likely to interest English operating surgeons, who will find in it succinct descriptions of a number of operations very rarely performed in this country, while they will be astonished to find how little known in France are some of our procedures. While several routes by which access can be gained to naso-pharyngeal polypi are described in some detail, there is only one thorough description of an operation for cleft palate, a modification of what in this country is known as Langenbeck's operation; no mention is made of Lane's, or any other flap operation, or of Brophy's procedure. Again, the only route of access to the pituitary described is a trans-sphenoidal one, involving turning down the nose; Horsley's cerebral route is dismissed in a few words as being difficult and dangerous, and Frazier's operation is not even considered.

Other striking divergences from English practice could be quoted, but enough has been said to indicate that readers of this little book will find it stimulating by providing an unusual point of view, although they would probably think it necessary to consult a larger text-book before embarking on an operation which they had only seen described in précis form, with but little reference to the difficulties, dangers, and complications. The book is well printed and lavishly illustrated.

PROGNOSIS OF INTERNAL DISEASES.

By HENRY L. ELSNER, M.D., LL.D., Professor of Medicine, College of Medicine, Syracuse University. London and New York: D. Appleton and Co. 1923. Pp. 1276.

THIS is a valuable book. Not only does the author discuss the prognosis of each disease, but he has been at pains to examine the prognostic importance of the chief complications and sequelæ in each case. In many cases he quotes valuable statistics as to the incidence of such complications, and at the end of each section the well-selected bibliography will be found of value by those anxious to read more deeply into any particular subject. Many laboratory tests are discussed, the utility of each from the prognostic point of view being carefully considered. It may, in fact, be said that at a time when medical text-books are multiplying with bewildering rapidity Prof. Elsner has produced a volume whose originality gives it an especial interest.

HEPATIC AMŒBIASIS.

Les Hépatites Amibiennes: Autochtones et Coloniales et Leur Traitement. By F. FRANÇON and J. HUTINEL, with a Preface by Prof. CHAUFFARD. Paris: Gauthier-Villars et Cie. 1923. Pp. 130.

HEPATIC amœbiasis in its manifold clinical guises is always a subject of very great interest to the physician in the tropics, and is, moreover, one with which the general practitioner, and even the specialist, in non-tropical countries is apt to be unfamiliar. This brochure by two distinguished French clinicians who gained their experiences of amœbic hepatitis and liver abscess during the war, is opportune. The diagnosis, ætiology, and pathology of these conditions are discussed with full references to the main contributions on the subject. The pleuro-pulmonary complications of liver abscess are admirably described, and recent experience has fully demonstrated the great value of the recognition of the true significance of signs at the right base. It is unfortunate that the authors should often convey the impression of attaching too great importance to the views of authorities quoted while relying too little upon the results of their own experience. A very full bibliography of 243 references is attached.

PSYCHOLOGY.

Recent Psychology and the Christian Religion. By CYRIL E. HUDSON, M.A., Assistant Curate, S. Mary Abbots, Kensington. London: George Allen and Unwin. 1923. Pp. 121. 3*s*. 6*d*.

THIS writer shows more than a literary knowledge of the first part of his subject and is to be congratulated on his sympathetic understanding. His theme is the relation of psycho-analytical observation and theory to Christian belief, and in his frank consideration he only once seriously departs from a correct statement of the position. That is when he attributes to the "Freudian school" the belief that "all human conduct, all human ideas, philosophies, religions, ideals, are the product of unconscious sexuality," a frequently repeated grotesquerie which has been dealt with by Freud in his "Introductory Lectures." A similar failure to go to original sources is indicated on p. 104, where a casual footnote reveals

that Mr. Hudson has accepted a newspaper version of Prof. Sherrington's address to the British Association which ascribed to him a view of the mechanical interpretation of mind directly opposed to that which he really expressed. One feels compelled to point out these blemishes because they are not in harmony wth the rest of the book. The chapter on psycho-analysis and sin is, if one may be pardoned the emphasis, a remarkably honest presentation of psycho-analytical methods, difficulties, and results. In discussing free will the author is surely swayed by a primitive instinct when he rejects McDougall's sole justification of punishment of the wrong-doer—the hope that it may "modify his nature for the better"—and says, "This position seems to make *blame* or *censure* meaningless"; if blame or censure has no modifying influence it certainly is meaningless, except as a mild gratification of the desire for retribution.

As seems inevitable in a discussion of first principles, the argument of the book will succeed or not according to the temperament and "complexes" of the reader. In those matters—and they are vital—in which he differs from "the psychologist who is also a thorough-going evolutionist," Mr. Hudson is scrupulously fair in presenting the views of the other side; one wishes that all controversialists were like him.

Evolution of the Conscious Faculties. By J. VARENDONCK, D.Litt., D.Sc. London: George Allen and Unwin. 1923. Pp. 260. 10*s.* 6*d.*

THIS is a continuation of the theme of Dr. Varendonck's "Psychology of Daydreams." Formerly he showed how practised introspection had enabled him to trace his own pre-conscious thoughts and to deduce certain tendencies operative just below the level of consciousness. In the present work he distinguishes between reduplicative and synthetic memory; even in mankind the former need not be associated with consciousness, and it determines the automatic and reflex behaviour characteristic of lower stages of evolution; but the necessity for choice determines repression of a certain amount of reduplicative memory and demands selection and synthesis to guide the reaction to external excitations. In this way the conscious faculties of man, in whom choice is continuous, develop from those of the animal, which only from time to time departs from reduplicative action.

In spite of an involved style, Dr. Varendonck produces in his readers a sense of the reality of his subject. His work is now coming to form a useful link between the intellectualist psychology and the psychology that studies processes which take place at the lower and more primitive levels of the mind.

LABORATORY DIAGNOSIS.

Traité de pathologie médicale et de thérapeutique appliquée. Diagnostics de laboratoire. II. Tumeurs, par M. P. MASSON, Professeur d'Anatomie Pathologique à la Faculté de Strasbourg. Paris: A. Maloine et Fils. 1923. Pp. 797. Fr.50.

THIS volume is the twenty-seventh of the whole series and the second dealing with laboratory diagnosis; if all the other volumes of the series are up to the standard of this one they deserve to be more widely known in this country. This particular volume is designed for the use of the practising morbid histologist, and consequently, in addition to a general theoretical discussion of the nature and growth of tumours, both granulomatous and neoplastic, and a full description of tumours of all sorts, it comprises an extensive and useful section on histological technique.

The "Etude Théorique des Tumeurs" is neither more nor less useful than such discussions usually are. The "Etude Concrète," however, is excellent; no class of tumours seems to have escaped the notice of the author, and of all of them his descriptions are admirably clear. What is more, these descriptions are accompanied by illustrations constituting the most valuable feature of the book; they are numerous, and the author has wisely not included a single microphotograph. In hardly any instance could the veriest tyro fail to identify a section from its appropriate illustration—and how seldom can this be said of microphotographs.

Morbid histology in this country, when it derives from abroad at all, tends to do so from German, to the exclusion of other sources. Perusal of this book calls attention to a number of interesting points not usually stressed in this country; for instance, the form of chronic mastitis, called by the author "Maladie de Reclus," occurring in young women, and illustrated by him in Fig. 49, is one which, though occasionally met with, has escaped the notice of most English writers; most pathologists will readily recognise it from the illustration, although some might disagree with the author's description of it as a "hyperplasie myo-epithéliale." Volkmann's view of the endothelial nature of the mixed tumour of the parotid is only mentioned that the author may insist on its untenability, and it is quite time that in this country the name "endothelioma" ceased to be mentioned in this connexion. On myeloid and melanotic "sarcomata" also the author holds views well worth the consideration of English workers.

And all pathologists in this country will greet with applause the author's concluding passage: "L'histo-diagnostic est un acte médical. C'est une consultation médicale dans laquelle la responsibilité de l'histologiste est gravement engagée, d'autant plus que son expertise est demandée en général en dernier ressort et commande la thérapeutique. Médecin, l'histologiste doit être payé en raison des services qu'il rend."

LIFE OF SIR T. P. ANDERSON STUART, M.D.

By WILLIAM EPPS, Secretary of the Royal Prince Alfred Hospital, Sydney. Sydney: Angus and Robertson, Ltd. 1922. Pp. 177.

THIS interesting book is partly autobiographical and partly matter compiled by Mr. Epps from documentary evidence supplied by Stuart together with personal recollections of the subject of the memoir. As Mr. Epps says himself, the book, owing to circumstances of publication, had to be cut down by about one-half and this has somewhat affected its balance, continuity, and smoothness, but the admirable introduction gives an excellent sketch of Stuart's many-sided character and activities, which sketch can be supplemented at the reader's will by reference to the main body of the work.

Thomas Peter Anderson Stuart was born in Dumfries in the year 1856, the son of Alexander Stuart and Jane Anderson his wife. He was educated at the Dumfries Academy and at the age of 14 was apprenticed to a chemist and druggist. After two years he decided to enter the medical profession, and after passing the preliminary examination during a further 18 months went to Wolfenbuttel in Germany, where he acquired a fluent knowledge of French and German. In November, 1875, he began his university career at Edinburgh, and his memories of those days and his recollections of Lister, W. Turner, and T. Keith are well worth reading. We think that his memory must have betrayed him in one small point and that is where he says (p. 29) that at this date "I saw the first young lady without a crinoline, which had been universal up to this time." He took his M.B. in 1880 and passed the first M.R.C.S. and primary F.R.C.S. Eng. examinations, obtaining in the latter 24 marks out of a possible 25. He then accepted the post of demonstrator to Prof. Rutherford, carrying with it that of assistant professor of physiology. The agreement between them, which Mr. Epps gives in full, is a curious and interesting document. With regard to fees for lectures, the Edinburgh professors in those days collected by themselves—i.e., they sold the class tickets at the door of the lecture room, "taking the money with their own hands

and giving change." Stuart stigmatises this custom as "rather degrading," but whether this be so or not the custom was simply a survival of mediæval university practice, when learned doctors used to employ a couple of students to negotiate with other students as to how much each was to pay. Rashdall (Universities of Europe in the Middle Ages) gives a delightful quotation from the works of Odofredus, an eminent jurist of Bologna, announcing at the termination of one course of lectures that next year he would give no afternoon lectures because the scholars were not good paymasters, "quia volunt scire, sed nolunt solvere." The same custom of payment obtained at Paris and Oxford.

Then came the great turning point in Stuart's life, for in 1882 the Government agreed to find the money for the provision of a medical school in the University of Sydney and applications were invited for the chair of anatomy and physiology. Various competent bodies were asked to nominate a professor, and the University of Edinburgh, the Royal College of Surgeons of Edinburgh, the College of Physicians in Glasgow, and the Royal College of Surgeons of England were asked for their views. All these bodies unanimously nominated Anderson Stuart. He arrived in Sydney in 1883 and found that the medical school consisted of "a little four-roomed cottage with walls about half-way up." How the school grew both in numbers and in the various buildings from this small beginning—4 students in 1883 and 857 in 1919, while the progress of the buildings is shown by the two photographs opposite pp. 52 and 114 respectively—must be read in Mr. Epps's striking narrative. This was Stuart's life work; to this end he organised, cajoled, and drove anyone who by reason of learning, interest, or money could further his heart's desire. And all the time he was teaching as only a master could teach, besides filling such important posts as that of Government medical adviser, President of the Board of Health, and chairman of the Board of the Royal Prince Alfred Hospital. Stuart died in 1920 of an internal malignant growth, of which he first became aware in 1919, and he passed the last year of his life under sentence of death with the same courage which he had always shown during his working years. A great man to whom anyone seeing the medical school of the University of Sydney may well apply the well-known epitaph of Wren.

A GREEN OLD AGE.

By Prof. A. LACASSAIGNE. Translated by HERBERT WILSON from the second French edition. London: John Bale, Sons, and Danielsson, Ltd. 1923. Pp. 321. 15*s*.

THE increase in the expectation of life which has become so marked during the last 50 years is apparently responsible for a corresponding increase in the number of books upon old age and what may be called its management. Prof. Lacassaigne's book on the subject is one of the best which we have seen. He has himself arrived at an age which even in these days may be called advanced, for he was born in 1843; he is a medical man and professor of legal medicine in the Faculty of Medicine at Lyons, is learned and widely read. We know on the best authority that the "cruda viridisque senectus" is the attribute of a god,[1] but a study of Prof. Lacassaigne's book will enable mere mortals, if not to attain old age, at least to enjoy the fresh and youthful senescence spoken of by Virgil. It is full of sound advice and the advice is accompanied by a wealth of illustration drawn from literature both ancient and modern, from artists, and from examples of those who have attained old age and found it green. Those whose years are declining will learn if they digest the principles laid down by Prof. Lacassaigne how to temper the sadness of Ecclesiastes' picture of old age by remembering Nestor, who "yielded not to grievous old age."

[1] Aen., vi., 304.

JOURNALS.

IN the MILITARY SURGEON for August there is a paper on Chemical Warfare and its Relation to the Medical Department by Lieut.-Colonel H. L. Gilchrist, Medical Corps, U.S. Army, who was, in the war, medical director of the Chemical Warfare Service, and afterwards head of the American Typhus Expedition to Poland. In the war we used to speak of "gas," but in future shall, he thinks, talk of "chemical agents." As these are generally heavier than air, they settle into shell-holes and dug-outs, making them dangerous, so positions on high ground will be more coveted than ever. The best protection is a gas-mask, but even a moistened handkerchief, wetted (it may have to be) with urine, is often of great value. Alkaline applications are recommended, ammonia for inhalation, weak (2 per cent.) bicarbonate of soda solution for the eyes, lime water and stronger soda solutions for the skin or to be taken by the mouth. Orderlies should be specially trained in first-aid for chemical casualties; they themselves at such times wearing always protective masks, gloves, and clothing. Every field ambulance should carry, for each person it is equipped to deal with, one litre bottle of oxygen, to be put on the stretcher with him if gassed, between his legs, its outflow being led by a rubber tube into his mouth or nose. Steam disinfection best gets chemical agents out of clothing; and shower baths, to free patients from mustard gas, should be pushed well forward, even in a battle to within five miles of the front.

Lieut.-Colonel E. L. Ruffner has a paper on the Citizens' Military Training Camp, which seems to be a very interesting effort of the Government to encourage the physical development of the people. The camp is in summer, it lasts a month, and is free to any young man over 16 and physically fit. Those who come get systematic physical training, education in discipline, order, and neatness, swimming, baseball, and other games, and are vaccinated and inoculated against typhoid, all for nothing. Colonel Ruffner was himself on the staff of such a camp in 1922; there were 2582 men in his, and the average gain in weight shown was 2½ lb. All were medically inspected on arrival, and only two serious cases were sent to hospital during the month. The State paid for their holiday and their teaching, just to make them better citizens, requiring of them no contract of service!—Dr. H. Lilienthal figures a simple and ingenious method for holding Carrel's tubes steady in a superficial wound. The tubes are bent at the ends, like capital J's, and the curved portions are worked into paraffined gauze which does not stick to the granulations, and out of the gauze the tubes do not tend to slip. This simple expedient was devised by a nurse, Miss Hervey, who served with the British Army in France.

An interesting paper shows that the disease called tularæmia is a *Bacterium tularense* septicæmia. It was first recognised in Tulare County, California, in 1912, by McCoy and Chapin, when investigating a novel epidemic amongst ground squirrels. It is found also in rabbits, and may be inoculated into guinea-pigs. It causes patches of necrosis on the livers of the rabbits, and cooks and butchers who handle these livers become infected if they have abrasions on their hands. There is inflammation at the point of entry, adenitis is associated, prostation and fever follow, with slow recovery after a month or two. Thirteen days after invasion the blood serum, in a dilution of 1 in 100, agglutinates cultures of *B. tularense*. The bacterium does not grow on ordinary agar, and only scantily on blood-agar, but, it is found by Surgeon Edward Thomas, of the U.S. Public Health Service, who presents this paper, it will grow freely on a serum-agar, with glucose (1 per cent.) and cystine (0·1 per cent.), and this in original isolation or in subcultivations. This disease was first found on the Pacific Coast, but Surgeon Thomas has found it on the Atlantic Coast too, for, out of 914 rabbit livers, taken in the market of Washington, D.C., he found seven were infected.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 29, 1923.

THE COMING INSURANCE SETTLEMENT.

THERE remain but three months before the end of the year, when new conditions for medical service under the Insurance Acts will come into force, and although the final proposals have not been made or accepted a large measure of agreement has been reached by conversations between the Ministry of Health and the Insurance Acts Committee of the British Medical Association representing panel practitioners. The fixing of the capitation fee was left until substantial agreement had been reached in regard to the services to be rendered for that fee, and within the next day or two the actual proposal in shillings and pence will reach the Insurance Acts Committee in time for its meeting on Oct. 4th. The final proposals both as regards terms and conditions of service will then be sent down to the panel committees in order that their representatives may come to a final decision in annual conference on Oct. 18th. No commendation would be too great for the spirit in which these conversations have been carried on.

Setting aside the amount of the capitation fee, which is as yet speculative, many points in regard to the terms of service have been decided to the satisfaction of all parties. These include in general terms: the limitation of panel lists, the free choice of doctor, the procedure of the Medical Service Subcommittee, procedure in regard to excessive prescribing, the right of the practitioner to have a patient removed from his list, and the access of the regional medical officer to the doctor's premises. Agreement has not been reached in regard to the right of panel committees to initiate complaints. Unless this concession is granted without giving the approved societies further facilities on their side for raising complaints, the panel medical service prefers to leave matters as they are. The proposal of the panel service to formulate a schedule of services that are outside the doctors' contract has not been accepted, and is not to be pressed, although the Insurance Acts Committee believes that such a schedule would be useful to all parties. The panel service is firm in its refusal to accept liability to give an anæsthetic or provide the services of an anæsthetist in connexion with *any* operation performed by *any* medical practitioner, although ready to make substantial concession. It is on the medical certification rules that the panel service is most keenly disappointed, for its proposals for the drastic reduction of the number of forms have not been accepted; the Insurance Acts Committee still believes that a friendly talk would solve the difficulties. The Committee's suggestion is in brief that all forms should be on two pieces of paper and that practitioners should be given the option of having these forms bound in one or other of two ways: (1) a separate book for each kind of certificate, (2) a book to contain copies of each kind of form—the one to meet the needs of urban, the other of rural practice. On one other knotty point disagreement remains. The Ministry endorsed the suggestion of its Insurance Consultative Council that in view of the unrestricted right to transfer at any time, there was no longer justification for allowing practitioners to treat insured persons as private patients. While the Insurance Acts Committee recognises the possibility of abuse, it regards the solution of this problem by regulations as impossible, holding that professional honour and increased knowledge on the part of the insured person must still be relied upon. There are insured persons who insist on exercising their inherent right not to accept the benefits for which they have paid, or who insist on going to another panel practitioner for a second opinion without mentioning the fact. Panel practitioners are often called into consultation by each other, and if no fee could be offered all consultation work of this kind would be transferred to non-panel practitioners.

We have emphasised the remaining points of divergence, although the measure of agreement is the striking feature of the situation. The agreement is indeed much greater than would be supposed to be the case from a perusal of the presidential address at the annual conference of friendly societies, which we summarise on another page. Public utterances of protagonists, although worthy of study, need not be taken quite at their face value. As the Insurance Acts Committee points out in the last sentence of its last communication, the two departments—namely, conditions of service and rate of remuneration—are indissolubly related, and any satisfactory arrangement arrived at must include both. We have substantial cause to hope that with the spirit now prevailing an arrangement will be reached towards the end of next month which will ensure good value to the insured person and willing service from the panel doctor.

THE CARE OF THE MENTALLY DEFICIENT.

THE annual report[1] of the Metropolitan Asylums Board is a recurrent reminder of the scope and variety of remedial work which this Board undertakes. To the London medical student who thinks of the M.A.B. hospital as synonymous with the treatment of scarlet fever and diphtheria, with a sprinkling of typhoid, it may be necessary to recall that the Metropolitan Poor Act, 1867, empowered the combined parishes of the metropolis to establish asylums for the reception and relief of the sick, insane, and infirm, or other classes of the poor, without limitation to any particular infirmity; and over and above its hospitals for the common infectious diseases, for small-pox, for venereal diseases, and for tuberculosis, the Board administers mental hospitals, with a total accommodation of 8800 beds and an industrial training colony for 2200 mental defectives. In these institutions the patients are classified from the higher grade of improvable patient in training at Darenth to the senile dements at Tooting Bec and the lower grade of imbecile child at Caterham and the Fountain Hospital, Tooting; the advantage of pooling the subnormal mental population of the metropolis has been amply justified by the increased efficiency achieved by classification. The average annual number of new admissions from the metropolis is just over 1500, and there are now more than 1600 patients received by agreement with provincial authorities under the Mental Deficiency Act of 1913, in spite of the fact that the war rendered this Act largely nugatory. Some minor rearrangements have been carried out during the year, including absorption of the special children's receiving home at Tooting Bec into the general accommodation of the hospital, and some adjustments at Leavesden and Caterham

[1] To be obtained from the office of the Board, Victoria Embankment, London, E.C. 4. 5*s*. Mental Diseases Section separately, 1*s*.

designed to reduce waiting lists and increase efficiency. All the patients at the Bridge Training Home, Witham, Essex, were transferred during the year to Darenth, where the industrial work has attained very large proportions. There is an output of over 20,000 envelopes weekly from the bookbinding shop, a weekly average of 112 new or remade mattresses from the upholstery shop, 400 pairs are dealt with weekly at the boot-making shop, while brush-, basket-, and mat-making are in full swing, and the tailoring shop is kept full up with orders. All this work is so important that we welcome the expansion of the annual report to its original size and form, in which a special section, edited by Dr. E. B. SHERLOCK, director of the Board's Mental Hospitals Service, is devoted to mental diseases.

As a training ground for nurses the M.A.B. mental hospitals provide an immense scope. Dr. SHERLOCK contributes to the report a note on mental nursing which is of particular value at a time when the relation of general and special nursing is being so closely considered. Certain American States are now making it compulsory on nurses who accept registration from the State to have received some psychiatric training, and, under the auspices of the General Nursing Council, proposals on similar lines may eventually be made in Great Britain. General and mental nurses have already been placed on the same footing so far as this Council is concerned, and to gain admission both to the general and to the supplementary part of the Register, five years' training will be necessary, of which three must have been taken continuously in an approved hospital whether general or mental. The certificate of the Medico-Psychological Association is of great value to the special nurse, for it distinguishes in the third year between mental nursing and the nursing of mental defectives, albeit the whole period of training for the certificate must still be passed in one recognised institution. The Association is continuing at present to grant certificates, although after June, 1925, the examinations of the General Nursing Council will supply the only means of reaching the Register. Dr. SHERLOCK concludes his timely note with an inquiry into the respective value to mental nurses of experience and of the capacity to pass examinations, a query which he leaves for the moment unanswered. The Board's mental hospitals and training colony are also available for post-graduate medical study as they have been placed on the list of recognised institutions in connexion with diplomas in psychological medicine. This is also the case with the Royal Earlswood Institution at Redhill, which offers facilities for the scientific study of all classes of mental defectives; demonstrations and lectures are given periodically to post-graduate and other students from London medical schools, and the resident appointments should prove attractive to scientific workers willing to coöperate in the solution of the many problems still surrounding the ætiology, pathology, and treatment of mental deficiency.

Amongst the causes assigned in the Earlswood report for the mental deficiency of the 35 recent admissions are heredity, shock or indisposition of mother, prolonged labour or instrumental delivery in eight each; tuberculosis or tuberculous history in three; premature birth in two; and of the following —consanguinity of parents, fright, meningitis, convulsions, encephalitis lethargica, pituitary insufficiency —one example of each. Twenty-one, or 60 per cent., of those admitted in 1922 were under 14 years of age, but there is a large adult population accumulated during the 75 years of the institution's existence, and 16 are referred to as being over 65 years of age and four over 75. The inmates are drawn from varied social classes, 15 being classified as free cases, 19 as life payment cases, 168 as elections and part payment cases, and 20 as payment cases aided by public and local authorities under the Mental Deficiency Act. It is unfortunate that a technical difficulty has arisen in regard to the further admission of patients of the last-mentioned class, the Board of Control demanding as a condition of Treasury grants towards maintenance certain "contracts" which the Earlswood Board are unable to undertake. Details are given in the report as to the care, treatment, education, industrial training, and recreations of the inmates, the medical side of the work being in the hands of Dr. D. HOOD, hon. consulting physician, and Dr. C. CALDECOTT, medical superintendent. The establishment of further institutions for defectives under the provisions of the Mental Deficiency Act will no doubt open careers for those desiring to specialise in this work. Moreover, there is at Earlswood a considerable scope for attaining experience in the management of diseases of children, especially of nervous type, which may be serviceable in ordinary practice.

DIFFERENTIAL ACTION OF X RAYS.

WHEN a beam of X rays passes through the tissues it gives rise in them to reactions which vary in severity with the nature of the tissue traversed. This is generally referred to as the selective action of the rays; it is one of the few indisputable facts in radiotherapy and is the solid basis upon which that therapy rests. There is, however, another and scarcely less important aspect of the effects of these rays upon cell life, and that is whether a differential action exists. The question was put by PERTHES as early as 1905 whether, in the absorption of the same quantity of soft and hard rays, the same physiological effects are produced. Since that date a good deal of evidence, mostly derived from clinical experience, has been brought forward by the French school of radiologists to show that in the case of the human skin differential action of this kind takes place. Their methods of measurement, however, lacked the precision which is necessary to settle such a question, and some years later the experiments of FRIEDRICHS upon a variety of organisms led him to the view that no such action existed. In our present issue a series of experiments are described by Prof. S. RUSS which seem to establish the position once more for a true differential action. It is maintained by the author that this proof depends entirely on the method which is used to measure the various doses of X rays in question. The customary method of measurement among physicists has been one based upon the ionising power of X rays, a method that has served them so well in the past that it is difficult to understand the long delay for its acceptance in medical radiology. Even so, however, the method has its pitfalls when accurate quantitative data are required and these are dealt with at some length by Prof. RUSS. For the specification of X rays two quantities are essential—viz., their wave-length and their intensity. Spectrometer methods are now available for the former, but for the measurement of the intensity there is no unanimity at present. We understand, however, that a joint committee of the Physical and Rontgen Societies has been formed with the object of defining a standard of X ray intensity which shall eventually enjoy international sanction and usage. If the main feature of interest in a differential action of X rays lies in its relation to the technique of the therapeutic application of these rays, it has an important bearing

on the general theory of the causation of the biological actions to which the rays give rise. So far the author has determined numerical ratios for only two varieties of tissue over a moderate range of the X ray spectrum. An extension of this class of observation, both in the range of the radiation and in variety of tissue should put us in a position to evaluate the physiological response in a more general sense than is possible at the present time.

AYURVEDA AND UNANI.

IT is intriguing to think that the drug lore of the Eastern world has not yet been fully exploited in the interests of scientific medicine. The discovery of the healing value of opium and quinine has its parallel in the romantic search in tropical jungles for the rare chaulmoogra tree. One of the best-equipped laboratories in India—namely, that of the Calcutta School of Tropical Medicine—is now occupied with the investigation of indigenous drugs, and Major R. N. CHOPRA and his assistants are examining berberine and other reputed anti-malarial drugs, in the hope that some of the remedies used by the ancient Indian systems of medicine may prove cheaper and more efficient than those imported at great cost from Europe. At this point the indigenous systems have been deemed worthy of an exhaustive report by one of the largest provincial Governments in India, and we are able to publish this week in another column a summary by our special correspondent of the conclusions of a committee appointed in November, 1921, by the Madras Government. Able and interesting as this report is, we doubt whether it will advance the repute of the Ayurvedic and Unani systems of medicine. The memorandum by Dr. S. MURTI, secretary of the committee, removes the report from the ordinary criteria of reason by stating that every system of Hindu thought is at once philosophy, science, and religion, all in one and one in all. Dr. MURTI gets over the present lack of modern scientific equipment by premising that the old Hindu teachers, by improving their own internal organs of sense, could extend their range of perception to include the visualisation of the atom. Modern conceptions of catalyst, enzyme, and hormone have for him had their precursor in the mysterious humours of Ayurvedic theory.

It is sadly apparent that, if there is no more to be said for this system than Dr. MURTI has to say, modern medicine has little to hope for from its contribution. The truth appears to be, as Sir PATRICK HEHIR justly and moderately states in a monograph reviewed in our present issue, that Ayurvedic medicine has remained stationary since the Middle Ages, and that while the Unani system, with its Rhazes and its Avicenna, helped in the foundations of Western medicine it ceased to be affected by the advance of science after being carried to India by the Mohammedan invaders. Both systems have, in fact, undergone serious deterioration, for new religions were introduced, caste distinctions became more rigid, and the Brahmins, fearing to touch blood or diseased matter, left the study of medicine to the lower and illiterate castes; so that when the British founded medical schools and hospitals in India 120 years ago the native systems were in the last stage of decline. The more advanced Ayurveds now practise a hybrid combination of the Western and Oriental systems. Dr. M. C. COMAN, attached to the Medical College at Madras, failed to find marvellous properties in any drug not already known to Western medicine, and even on the plea of economy he found that the cost of maintaining an Ayurvedic dispensary was much the same as that of any other dispensaries. Dr. COMAN did, however, find a few drugs worthy of future study, including *Hydnocarpus inebrians*, potent in ameliorating the complications of leprosy, *Artemisia maritima*, a substitute for santonin, and *Boerhavia diffusa*, a good diuretic for anasarca. Sir PATRICK HEHIR demands a comprehensive investigation of native drugs and curative methods, asking for a more or less permanent committee, consisting of chemist, physiologist, pharmacologist, along with a native practitioner of high repute. His own feeling is that the attitude of indifference and hostility has been not altogether wise, for it has tended to the creation of a harmful class of quack and charlatan. The Hindu system could hardly have survived for over 2000 years, nor the Arabic system for many centuries, if they did nothing but harm, and the desire now becoming vocal on the part of Ayurvedic and Unani practitioners to bring their systems into more intimate relation with modern scientific medicine deserves recognition. We shall ourselves benefit by acquiring the useful parts of their knowledge.

Sir PATRICK HEHIR strikes a note of warning, for he does not believe that Western medicine has got as firm a hold on the people of India as many have supposed. The Medical Registration Act of 1916 neither included nor expressly excluded practitioners of Oriental systems, and he would solicit their coöperation in formulating curricula of education and in prescribing the courses of theoretical and practical training over some years before granting qualification to practise. Gradually the science of modern medicine could be introduced into the Oriental systems, which would then become instruments for conferring vast benefits on the people of India. There may be no other way in which adequate medical treatment will reach the masses of India in the immediate future.

Annotations.

"Ne quid nimis."

THE CENTENARY OF "THE LANCET."

ON Sunday, Oct. 5th, 1823, the first number of THE LANCET appeared, and in celebration of the event a special number of the journal will be issued on Oct. 6th, and a Centenary Dinner will be held in London on the evening of Thursday, Nov. 29th, at the Hotel Victoria, Northumberland-avenue, London, W.C., at 7.30 for 8 P.M. Sir Donald MacAlister, President of the General Medical Council, will take the chair, and will be supported by the Presidents of the Royal Society, the Royal Colleges of Physicians of London, Edinburgh, and Dublin, the Royal Colleges of Surgeons of England, Scotland, and in Ireland, the Chief Medical Officer of the Ministry of Health, the President of the British Medical Association, and the Presidents of the Royal Society of Medicine and of the Medical Society of London. The Minister of Health has signified his intention of being present, and it is hoped that a gathering representative of all the interests associated with the medical profession will meet on this occasion. Those who desire to be present should communicate at their early convenience with Mr. H. D. Gillies or Dr. J. H. W. Laing (hon. secs.) at 7, Portland-place, London, W. 1.

The charge for the dinner has been fixed at 15*s.*, exclusive of wines, and if notice be given in advance endeavour will be made to arrange that friends who so desire shall sit together.

PRIMARY CARCINOMA OF THE THYMUS.

Dr. Victor C. Jacobson,[1] of the Peter Bent Brigham Hospital, Boston, who records an illustrative case, remarks that primary tumours of the thymus are uncommon, primary carcinoma, of which this case is an example, being exceedingly rare. The first diagnosis of carcinoma of the thymus seems to have been made by Bristowe in 1854. Only 2 cases have appeared in American literature, 13 have been recorded by French writers, all between the years 1890 and 1908, and 6 by English and German observers, or a total of 21 cases. Fourteen were males, 3 females,

[1] Archives of Internal Medicine, June 15th, 1923.

and in 4 the sex was not recorded. The age-incidence differs from that for epithelial growths in other organs. Altogether 15 patients were of the "cancer age," 6 were aged from 18 to 22. The relatively high percentage of thymic tumours in young persons is explained by the early evolution of the thymus as compared with other organs. In 3 of the recorded cases no metastases are mentioned. Lung metastases were reported in 4 cases, direct extension into overlying lung tissue was noted in 2 cases, in one of which the mediastinal lymph glands were involved. In one instance there was growth into the superior vena cava, and in two others the pericardium was affected. In only two instances in which nodules were present in the liver was a tumour found elsewhere than in the thorax. Dr. Jacobson's case occurred in a man aged 42, in whom the outstanding clinical features were the lack of local signs of thymus tumour and the predominance of symptoms referable to the destruction of several vertebræ. The symptoms were increasing pain and stiffness in the back and hips, and lower dorsal kyphosis. In spite of the large amount of lung tissue replaced by tumour the patient had little respiratory distress until shortly before death, which occurred after about eight months' illness. Although he also had acute appendicitis, all pain and tenderness in the appendix region were masked by the constant severe pain caused by the tumour in and about the vertebral column. The thymus tumour itself was comparatively small, and could not have caused much mechanical inconvenience. The lymph and blood-streams, however, were invaded early, the tumour being brought to the lungs by the pulmonary artery. In the lungs tumour cells gained entrance to the pulmonary veins and, reaching the systemic circulation, invaded the spine, liver, and suprarenals. The greatest interest from the pathological standpoint was the peculiar degenerative changes in the nucleus and cytoplasm of the tumour cells in the thymus and in the secondary growths.

THE WELFARE OF THE BLIND.

THE Blind Persons Act of 1920 imposes the duty on county and county borough councils to promote the welfare of blind persons ordinarily resident in their area. The fourth annual report of the Advisory Committee on the Welfare of the Blind records the progress now made. There are only four out of 145 local authorities who have not yet submitted schemes to the Ministry of Health for approval, and the majority of these schemes are now in operation. Their financing depends partly on the rates and partly on subsidies from the Ministry of Health, but the principle of making full use of voluntary agencies and the grant to them when necessary of financial assistance is maintained. This principle has been objected to by some theorists, but the fact remains that up to the present there has been no reduction of voluntary contributions to the funds of agencies for the blind. Out of a total of £75,000 paid by the Ministry of Health last year in respect of services provided for the welfare of the blind £33,000 went to workshops, £9000 to home workers, and £14,000 to home teaching. With regard to workshops for the blind the report states that workers in them may be grouped in four categories: (*a*) 60 per cent. are good workers, able to earn at trade-union rates 16*s*. a week in the case of men and 8*s*. a week in the case of women; (*b*) 8 per cent. are good workers but slow; (*c*) 28 per cent. are of low earning capacity capable of common work only; (*d*) 4 per cent. are devoid of any real earning capacity.

In view of the large proportion of low wage earners, the Committee recommends that there should be an efficiency and productivity test before any blind person is admitted to a workshop, and the Ministry of Health has given notice that from April 1st, 1924, it will not be prepared to recognise for grant purposes any blind person as a journeyman until satisfied that he has attained as high a standard in the quality, speed, and independence of his workmanship as is reasonably attainable by him. The problem of assisting home workers presents greater difficulties than that of assisting workshops. At the present time there are about 1000 recognised home workers, and for the time being the Committee recommends that earnings should be augmented at a flat rate not exceeding 10*s*. a week. A more important matter is the supply of teachers for home workers, and a good deal of attention has been paid to it. All home teachers, in order to earn the grant, must now pass the examination of the College of Teachers within two years from the date of their appointment. The first of these examinations was held last May at the School for the Blind, Swiss Cottage, when over 50 persons, all of them home teachers, presented themselves for examination. Besides these two classes of blind workers the Committee have approached the question how far it is possible for employment to be found for some of them in factories and workshops where ordinarily only seeing operatives are employed. In Germany it is said that as many as 450 blind persons are actually employed in ordinary factories and workshops. The report appeals to the employers of this country to interest themselves in this matter, and to grant facilities for testing the ability of blind persons to perform simple operations usually carried out by seeing workers.

The degree of blindness which qualifies for assistance under the Act is a matter needing more exact definition than it has yet had. There are a number of border-line cases who may have been encouraged for a number of years to regard themselves as blind, and the Committee favours the continuance of grants to these. On the other hand, there are a number of children in blind schools to-day, chiefly myopes and subjects of phlyctenular keratitis, who are weak-sighted but not blind. It is in the interests both of the country and of themselves that these children should be allowed to use the sight that they have under proper supervision, such as is given at the L.C.C. myope schools.

AUTO-PYO-THERAPY.

THE practice of auto-sero-therapy does not seem to be as popular as it was some years ago, and the results of the subcutaneous injection of a few c.cm. of a pleural effusion taken from the same patient have not been uniformly good. A treatment which bears at least a superficial resemblance to auto-sero-therapy has lately been advocated by Dr. Endre Makai,[1] head of a surgical children's hospital in Budapest. For more than a year he has been treating every case of localised suppuration by auto-pyo-therapy, dispensing altogether with a knife, and adopting a procedure the technique of which is perfectly simple. The pus in an abscess is aspirated, and 1 c.cm. is immediately injected subcutaneously, this procedure being repeated every fifth day as often as necessary. Several such injections have been given in each of more than a hundred cases, the ages of the patients, most of whom were children, ranging from infancy to 40. In the case of closed, cold, tuberculous abscesses, the subcutaneous injection of 1 to 10 c.cm. of the pus never gave rise to a troublesome general reaction such as fever or general malaise. On the contrary, there was often a dramatic improvement with gain of weight. At first there was no local reaction. As the injections were repeated, more and more definite areas of painless infiltration would appear. The microscopic changes in such areas were characteristic of tuberculosis, but tubercle bacilli were not demonstrable, and the infiltration always disappeared automatically. After two to eight injections, during which the pus steadily became more fluid and transparent, the abscesses dwindled or disappeared completely. Curiously enough, the subcutaneous injection of another patient's cold abscess into a person suffering from the same complaint had no effect. Good results were also obtained when a cold abscess communicated with the exterior by a fistula.

[1] Deut. med. Woch., August 31st, 1923.

but in these cases the site of the injection was apt to show a severe reaction. Most of Dr. Makai's cases of suppuration were, however, due to non-tuberculous organisms such as streptococci, staphylococci, coliform bacilli, and the like. In none of these cases did the treatment provoke progressive infection, a phlegmon, or sepsis. In about 30 per cent. there was no reaction at the site of the injection, and in another 30 per cent. a slightly painful infiltration disappeared completely and spontaneously in eight to ten days. In the remaining 40 per cent. a definitely circumscribed abscess formed at the site of injection, healing spontaneously or after aspiration. Although hundreds of such injections were given, it was necessary only in two cases to make a 3 mm. long incision. Only localised suppurative processes were, as a rule, thus treated, and among the cases there were some of suppuration in the cervical and inguinal glands, empyema, mastitis, periostitis, mastoiditis, and osteomyelitis. There were, however, two cases of severe progressive phlegmon of the neck in young children successfully treated in this manner, and one of the illustrative cases recorded in detail was that of a child, 18 months old, the right lower lobe of whose lung contained a cavity of the size of an egg. Puncture of this cavity, which was diagnosed by the X rays, yielded gaseous, greyish-yellow, thick pus containing elastic fibres, the *Bacillus fusiformis*, streptococci, and coliform bacilli. There was remittent fever reaching 39·3° C. at times, and the prognosis seemed hopeless. Five injections of 1 c.cm. of this pus were given at five-day intervals. Small abscesses with the flora of the mother abscess developed at the sites of injection. The temperature fell to 37·1° C., the exploratory puncture of the lung no longer yielded pus, the X rays showed an ill-defined shadow in the position of the former abscess cavity, and the appearance of the child was most flourishing, her weight having increased from 7·9 to 9·2 kilos in less than two months. Dr. Makai is conducting further experiments with this treatment, and he has already found that if the aspirated pus is exposed to the quartz lamp for 15 minutes before injection or is chilled for half an hour, the responses of the organism are quite different. Dr. Makai has certainly made out a case for further investigation, but this will have to be very thorough as well as confirmatory of his findings before his treatment can be accepted at his own valuation.

THE MILNE TREATMENT OF SCARLET FEVER.

IN the correspondence columns Dr. A. H. G. Burton draws attention to the great practical significance of an article on the treatment of scarlet fever which appeared in our columns on Sept. 8th, wherein Dr. G. Gushue-Taylor courageously recanted a theory of which he had been one of the principal advocates. The figures given in proof of recantation were striking, if not absolutely convincing. The fact that seems to us to rob the observations of final proof is that the figures giving the effect of return to the principle of isolation (Table A) are derived from a single year only, and from a year in which the incidence of scarlet fever was somewhat low. Figures over several years, including one in which the incidence was considerable, would carry conviction. In the same table it is noticeable that in 1920, with a total of 50 cases, there were only four return cases, a figure which is remarkably low if the eucalyptus treatment is really valueless. Nevertheless, it now seems highly probable that the facts reported by the late Dr. R. Milne are explicable on ordinary epidemiological principles. Prolonged isolation is a serious problem from educational and economic points of view, even if our experts are coming to the conclusion that mild uncomplicated cases of scarlet fever may be safely discharged at the end of four weeks; and we can only regret that Dr. Gushue-Taylor has been driven to abandon what appeared to be a hopeful alternative treatment. Nor can we feel that his remarks on the more efficient treatment of nasopharyngeal complications are very helpful, for inhalation of friar's balsam does not appear of much preventive value in other infections, and he throws no new light on the difficult choice of which tonsils to condemn and enucleate. Before resigning ourselves to the cumbersome protection of prolonged isolation, we may hope that medical officers of health, with Dr. Gushue-Taylor's admirable spirit of inquiry and progress, will make further trial with other local disinfectants such as chloramine-T.

THE REGISTRAR-GENERAL'S REPORT FOR 1921.

WE complete this week a brief summary of the concluding volume of the annual report of the Registrar-General for 1921, a report which calls for detailed study by all who wish to keep abreast of the progress of medicine in our own times. We have already singled out for special notice the section in which the writer, presumably Dr. T. H. C. Stevenson, whose name is not mentioned, illuminates the relation of tubercle to infantile mortality. This week we reproduce two charts, one of which illustrates recent remarkable changes in the age-incidence of mortality from influenza, the other the equally striking changes in that from cancer. Now that the whole "Review" (as it is now called) for 1921 has appeared it is the time to return to a consideration of the new format. The present volume is, we freely admit, handy in form and comparatively light, but further experience has not decreased our repugnance to the cramped page and the minute figures in which the tables of Parts I. and II. are printed. The change must seriously increase the difficulties of study except to the myope. It is also a hardship to the student of statistics that long months have elapsed between the publication of the tables and the text; possibly in the future a shorter interval between the three parts will be secured. The substance of the report is so well worth study that no pains would be wasted in enabling that study to be made with comfort and efficiency.

A STANDARD FOR MENTAL HOSPITALS.

ANY administrative change which would actually enforce a certain standard of treatment in mental hospitals would probably benefit the insane as a whole, provided that it carried no disadvantages in other directions. It is well known that this standard at present varies widely, and the Board of Control has no powers of enforcing changes in an institution presenting unsatisfactory features, unless a case of cruelty to a patient is proved, beyond declining to sanction transfers, a step which would be quite indifferent to the committee of the average county hospital. "Nationalisation" of mental hospitals, as suggested by Dr. A. T. W. Forrester in another column, would achieve a uniform standard of treatment, and at the same time enable the existing buildings so to be utilised as to afford separate and efficient treatment to recoverable cases. But if this "service" were made as efficient as possible, if all the varied and necessary equipment were provided, and an adequate staff paid at rates which would attract the "young, active, progressive, and best qualified members" of the medical profession (and, correspondingly, qualified recruits to the nursing profession), if, in fact, all that needs to be done were done, this service would cost not less but far more than the present cost of maintenance of the asylums. Money is the obstacle to these improvements; no one has ever suggested before that more could be done with the present expenditure of eight millions per annum; mental hospital committees, who, incidentally, work gratuitously, cannot often be accused of wasteful expenditure.

The main objection which we have to a State service is one which applies to the State management of any concern—namely, that it hampers originality and enterprise. A keen medical superintendent anxious to adopt a new form of treatment might have his scheme held up for years either on the score of expense or

because some bureaucrat disagreed with or misunderstood the underlying hypothesis. At the same time some of the smaller, and in particular the private, mental hospitals would be apt to lose their traditions and individual character—assets of no small value. Outside local bodies who interest themselves in the welfare of asylum patients in a dozen different ways would feel their responsibility lessened, and much valuable work of this kind might be dropped. Dr. Forrester's forecast of uniform clothing is alarming in itself. Nationalisation should be possible without this sort of inhuman standardisation.

A CENTRAL MEDICAL INSTITUTE FOR PAISLEY.

THE medical officer of health of Paisley, Dr. G. V. T. McMichael, records in his annual report for 1922 a munificent offer. Miss Russell, of Muirfield, Paisley, intends to erect a central medical institute for the benefit of the mothers and children of the town as a memorial to her two brothers, the late Messrs. Robert and Thomas Russell. The institute, when erected, will accommodate all the various clinics conducted by the local and education authorities. Dr. McMichael pointed out in his 1921 report how severely the work of both authorities was handicapped by the hopeless inadequacy and unsuitability of the existing premises; so that no gift could have been more opportune. At the request of Miss Russell, Dr. McMichael and Dr. R. Donald, the chief school medical officer for Renfrewshire, have prepared a scheme which provides, in addition to the usual requirements of a maternity and child welfare centre, a tuberculosis dispensary and a school medical department, accommodation for clinics for minor ailments, dentistry, and eye, ear, nose, and throat affections, a remedial department for deformities, an X ray department and a disinfecting clinic for dealing with verminous children. Dr. McMichael points out the obvious advantages, from the point of view of convenience, economy, and avoidance of overlapping, in having all these clinics concentrated under one roof. A joint committee of the local and education authorities has been appointed to consider the whole question of coördination of the work. Miss Russell has approved the scheme as outlined and has appointed her architects. An ideal central site has been secured, the building will be begun without delay, and when completed and fully equipped will be handed over to the health authority, free of all cost. Paisley will be envied by other towns for being able to claim as its citizen a woman of Miss Russell's vision and generosity. Her gift is well timed in these days when public health work is hampered by lack of funds. It is also especially appropriate at a time when there is a widespread desire to secure a better coördination of the medical services employed by the various local governing bodies.

DISTRIBUTION OF ACROMEGALIC STIGMATA.

Lenz[1] recalls that while acromegaly affects several different kinds of tissue, it affects only one kind of locality in the body, for the fingers, toes, chin, nose, and ears are all distal parts. Now a very similarly distributed occurrence, not of local overgrowth but of pigment, is to be observed in one or two breeds of domestic animals, notably in a kind of rabbit called by continental fanciers "Russian," although not connected with that country. These animals are albinotic except for black ears, muzzle, paws, and tail—which parts have also a lower temperature than the rest of the body, the dividing line in the case of the ears being very sharp, for the auricle at its insertion is warm, while a millimetre or two higher up, just where the black pigment begins, it is markedly cooler. The author cites a number of experiments, illustrated by photographs, from which he deduces that the lower temperature is indeed productive of the pigmentation. If in winter time some white hair were removed from the back, the new growth was pigmented, and least so at the edges of the denuded area, where the surrounding hair might be expected to afford some protection from the cold. If summer were chosen for the experiment, the new hair showed less pigment, and particularly at the roots, where again there would be most protection from the cold; moreover, in summer the new pigmentation was not permanent, its disappearance beginning at the edges of the patch. The critical skin temperature, below which pigmentation followed, seemed to be about 25° C.; and Lenz mentions that certain ferments, such as might be concerned in bringing about pigmentation, are active only below a certain temperature. Some confirmatory circumstances are next adduced. The new-born rabbits, which, of course, in the womb or in the nests are not exposed to cold, are nowhere pigmented. The characteristic pigmentation of distal parts increases in winter and decreases in summer. Small and weakly animals showed it best. Conformably with this, breeders recommended keeping the animals in unheated hutches; moreover, the whole breed was very small and delicate, as might be expected, for clearly it was being selected for cold extremities, and so for a weak blood circulation. The peculiar "Russian" marking, to be seen in a breed of guinea-pigs and of cats (Siamese) as well as in rabbits, probably depends then upon incapacity to form pigment in presence of a temperature higher than 25° C. For this same reason—namely, that they have the weakest blood circulation and therefore the lowest temperature—may the distal parts be chosen for dysharmonic growth in human acromegaly. The essential cause is, of course, an over-functioning of the hypophysis; but its hormone may be more active at a temperature rather below that of the central parts of the body. It is also conceivable that one of the functions of this gland is to stimulate metabolism at low temperatures, for the northern European races are of more acromegalic aspect than the southern ones. This is, of course, in accordance with the view of racial characters being dependent upon endocrine influence. The suggestion is made that a desirable experiment would be for an early acromegalic subject to wear continuously a warm glove on one hand only, to see if this hand showed difference in growth from the other one.

[1] F. Lenz: Archiv für Rassen- und Gesellschafts-Biologie, Bd. xv., H. 1, S. 24.

BOARD OF CONTROL: ANNUAL REPORT.

THE ninth annual report of the Board of Control, besides providing interesting statistics, surveys as usual the events of the year (1922) in connexion with the treatment of the insane and the mentally deficient. Most of these events have already been chronicled and discussed in our columns, and it remains to congratulate the Board on their progressive attitude, their tolerance of criticism, and their manifest anxiety to use interest, when it appears even as adverse judgment, to better the conditions under which the insane are detained. It is admitted that there are many directions in which improvement is possible in the way of prevention and of cure, but it is emphasised throughout that improvements and developments must involve increased expenditure, the incurring of which the community must be prepared to sanction. If the result of agitation is to arouse in the mind of the public a permanent and not a merely fitful and evanescent interest in the welfare of those suffering from mental disorders much good may result. Some few reforms are not dependent on outlay and are being actively encouraged—for example, permission to a patient to wear his own clothing, or at least to retain the same suits, dresses, or boots when transferred to another ward.

In discussing the annual report for the year 1920, we deprecated the small amount of space devoted to an account of the research work done in mental hospitals. This year a supplement of 25 pages summarises scientific work accomplished and in progress at 12 institutions, ranging from work on the ætiology and pathology of obscure diseases to com-

parative studies in different methods of treatment, including the inoculation of malaria parasites in the attempt to influence general paralysis of the insane. Future research is to be even more extensive. The establishment of the Birmingham Joint Board of Research, under the directorship of Sir Frederick Mott, into the causes of mental disorder is viewed with favour by the Board, who announce their hope that corresponding research centres will be instituted in connexion with each university in England and Wales, and that with each of these centres will be grouped and affiliated every neighbouring institution in which mental cases are received. The function of these centres should be research, and should include such investigations as cannot properly be undertaken in a small clinical laboratory. This latter provision now exists in a considerable number of mental hospitals, but by no means in all of them, and it is the strong view of the Board that no mental hospital should be without one. Work should be systematically prosecuted in these laboratories, not only supplementary to post-mortem examinations, but in aid of routine clinical investigation. Further, with the institution of research centres, the Board hope to see the development of mutual coördination between them whereby interchange of information would be facilitated, results usefully compared, and needless duplication of effort avoided.

LONDON MEDICAL EXHIBITION.

ON Oct. 1st, and during the four days following, the fifth London Medical Exhibition to be held since the war will occupy the Central Hall, Westminster. We understand that the promoters have taken pains to assemble all the most modern developments in scientific appliances, preparations, and publications likely to be of interest to the medical world. The exhibition thus represents the outcome of scientific research brought into the realm of practical utility by commercial enterprise. It is a far cry to the time when the physician digged his own herb-garden and his medical books were family heirlooms; to-day commerce has advanced hand in hand with science, and we owe it in no small measure to the great medical and surgical houses that modern medicine has reached its present high level of practical achievement. The large number of doctors, not only from the metropolis, but from all parts of the world, who in past years have visited the exhibition has definitely established the value of this undertaking. The fact that the general public is rigidly excluded refutes any suggestion that this exhibition is run for trade purposes alone; experience in the past has shown that the benefits accruing to trade and profession have been mutual. It is of importance to a practitioner that he should be familiar with the products of those firms that cater for his requirements—both in his own interests and in those of his patients. The exhibition affords an opportunity to taste, see, and handle which can be had so easily and so conveniently in no other way.

Sir Archibald Garrod has been appointed to serve on the Medical Research Council to replace Prof. F. Gowland Hopkins, who retires under the provisions governing the rotation of membership.

ROYAL SANITARY INSTITUTE.—A sessional meeting will be held on Oct. 12th and 13th in the Town Hall, Carlisle, commencing on Friday at 7.30 P.M., when a discussion will take place on "Public Health Administration of Measles and Whooping Cough, from the points of view of a County Borough and a County Area," to be opened by Dr. J. Beard and Dr. F. H. Morison, Dr. T. Eustace Hill presiding. A discussion on "Some Aspects of Housing in Carlisle" will be opened by Mr. Percy Dalton, followed by Mr. A. Horsburgh Campbell, Dr. A. K. Chalmers, Dr. Kenneth Fraser, Dr. G. W. N. Joseph, Dr. Harold Kerr, Dr. E. W. Rees-Jones, Dr. J. E. Spence, Dr. J. T. Wilson, and others. On Oct. 13th visits will be paid to various works in the neighbourhood.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXXVIII.

THE TREATMENT OF GLYCOSURIA IN PREGNANCY.

THE urine of a pregnant woman should always be examined at intervals, since albumin or sugar may be present in the urine some considerable time before any other signs or symptoms appear. Fehling's test is generally used for sugar, though it is not very delicate and may give rise to error. The error may be due to (1) bad Fehling's solution, since if the two solutions A and B are mixed, and then kept for a long time, the solution may reduce itself when it is boiled; (2) the presence of other substances, such as creatinine, uric acid, and glycuronic acid, which reduce Fehling's solution. Thus a positive test with Fehling's solution must be confirmed by other tests. The simplest of these is Benedict's, which is gradually replacing Fehling's for clinical work, as it is more reliable and gives very little more trouble; 5 c.cm., or 90 minims, of Benedict's solution and 10 drops of urine (as measured with a dropper) are boiled together. If dextrose is present in a concentration of over 0·5 per cent. there will be a precipitate in about 30 seconds after the onset of boiling, but to make certain the mixture should be boiled for two minutes. If the solution remains quite blue it means that sugar is present in a concentration of less than 0·1 per cent.; if the colour turns green it means that there is more than 0·1 per cent. present. Instead of boiling for two minutes over the flame, the test tube, after the solution has been well mixed, may be placed in boiling water for five minutes, which is perhaps an easier method for a busy practitioner.

Differential Diagnosis of the Reducing Substance.

A positive Benedict's test does not necessarily mean that dextrose is the reducing substance present in the urine, since (1) lactose, (2) lævulose, (3) a pentose, (4) homogentisic acid all give a positive test. (3) and (4) are very rare, but (1) and (2) must always be considered; the distinction between these requires some knowledge of chemistry.

Lactose may be present in the urine of a pregnant woman as soon as the breasts show signs of activity, but is usually only present (*a*) in the last weeks of a pregnancy; (*b*) after the child has been born; (*c*) if the lactation has been abruptly checked. Lactose is not fermented by yeast, and it is further distinguished by the difficulty of preparing the osazone crystals by heating with phenyl hydrazine and potassium acetate. The crystals, if formed, differ in many respects from those of glucosazone. Lactosuria is a harmless condition, which will pass away when lactation comes to an end, and demands no treatment.

Lævulose is present in the urine under certain conditions. (1) If the liver is seriously damaged, as in acute yellow atrophy of the liver, poisoning with salvarsan, or trinitro-toluene. Lævulose is often used as a test for the condition of the liver, since it may be excreted in the urine after a dose of 25 g. of lævulose. It is better to estimate the amount of sugar in the blood after the dose of lævulose, since, if it is raised at all, it is probable that the liver is considerably damaged. (2) Lævulose may be present under conditions which have no known pathological importance, and may be excreted for years without any symptoms. (3) It may be present during pregnancy; Cammidge has found that in 25 per cent. of cases, when a reducing substance is present in the urine of pregnant women, it proves to be lævulose. Lævulose reduces Fehling's and Benedict's solutions, is fermented by yeast, and gives osazone crystals which are identical with those of dextrosazone. It can

therefore be distinguished from dextrose only by the fact that it rotates the plane of polarised light to the left. This test can only be made with the aid of a polarimeter. If lævulose is present in the urine during the course of a pregnancy the question of serious damage to the liver should be carefully considered, but if there is no evidence of this it is probable that the lævulosuria has no significance and the condition can be safely neglected.

Significance of Dextrose in Urine.—When it has been proved that the reducing substance in the urine is dextrose it does not follow that the patient is suffering from diabetes mellitus. Any of the following conditions may cause dextrose to appear in the urine: (1) exophthalmic goitre, (2) acromegaly, (3) renal glycosuria, (4) temporary diminution of sugar tolerance, (5) true diabetes mellitus. Exophthalmic goitre and acromegaly can easily be diagnosed and need not be further considered.

Renal Glycosuria.

With the knowledge gained from the estimation of the sugar in the blood, it has been realised that dextrose may be excreted in the urine without there being any increase in the amount of sugar in the blood, and therefore no diminution in the sugar tolerance. This condition is termed a renal glycosuria, and it is believed that the threshold of the kidney—i.e., the point at which sugar is excreted in the urine—is lower than in normal persons. This condition occurs in from 0·1 to 1 per cent. of the population, and is usually only discovered by accident, as the patients do not have any of the ordinary symptoms of diabetes mellitus. The diagnosis may be suspected from the history of the discovery of the sugar and the absence of any symptoms, but can only be made with certainty if an estimation of the blood-sugar is made at half-hour intervals after a dose of 25–50 g. of dextrose. The blood-sugar curve will resemble that of a healthy person who has a normal sugar tolerance, in that it will not rise above 0·18 or 0·19 per cent. at the end of half an hour and will have returned to normal after one, two, or three hours. Sugar, however, will be excreted in the urine in amounts of 1 to 4 g. (15–60 gr.) per hour by the patient who has a renal glycosuria. Some patients with a renal glycosuria excrete sugar when the blood-sugar is quite normal—i.e., 0·08 per cent.—while others do not begin to excrete sugar until it has risen above 0·13 per cent. or so. The diagnosis can be clinched by adding definite amounts of bread, 4, 8, 16 oz., on successive days and estimating the amount of sugar excreted. A patient with renal glycosuria will excrete very little more sugar after the 16 oz. than after the 4 oz. of bread. The total amount of sugar will vary in different cases from 5 to 30 g. (75–450 gr.). Once the diagnosis has been made the patient does not require any treatment, and may eat ordinary food. Several women who have had a renal glycosuria for many years have borne children without suffering any ill-effects, and the children do not necessarily have a renal glycosuria, although this is often the case. It has recently been shown that a renal glycosuria may be caused by pregnancy, since the threshold of the kidney for dextrose is altered during pregnancy. Sugar may be excreted in the urine, although the sugar tolerance is normal, and the blood-sugar does not rise above the normal limits. The amounts of sugar which are excreted are small, and usually only appear after a large dose of sugar—i.e., 100 g.—has been given. The correct diagnosis may be suspected from the complete absence of symptoms and the small amount of sugar which is excreted, and can be established by estimating the blood-sugar. The condition requires no treatment.

Temporary Diminution of Sugar Tolerance.

In all the conditions hitherto described there has been no reduction of sugar tolerance, but a certain number of pregnant women do develop this. The actual amount of sugar which is excreted is not large—10, 30, or 50 g. in the day. These amounts are either the same or a little larger than those excreted by patients with a renal glycosuria, so that the diagnosis cannot be made by examination of the urine. It can only be made with certainty by estimating the blood-sugar at intervals after a dose of 25 or 50 g. of dextrose. If there is a diminution of sugar tolerance the blood-sugar, half an hour after the sugar was taken, will be either already above 0·20 or quite close to this point; at the end of one hour the blood-sugar will be above 0·20, and will not have returned to normal at the end of two hours, or perhaps three or four hours. Such a curve is typical of a diminution of sugar tolerance; some information can be obtained by estimating the blood-sugar at the end of one hour only, since if the blood-sugar is above 0·20 at this point there is a diminution of sugar tolerance. The urine before the test may not contain any sugar although the blood-sugar is normal, but since many patients who are pregnant are believed to have a lowered threshold for sugar, there may be a coexisting renal glycosuria. The course which the condition runs is almost invariably favourable, since after the child is born the sugar disappears from the urine; it may reappear during the next pregnancy. The patient will need careful watching; the total output of sugar should be estimated and the carbohydrate intake reduced to a definite amount, say 4 oz. of bread. If the output of sugar is reduced to about 10 g. this reduction is probably sufficient, especially if the blood-sugar when fasting is normal, since there may be a coexisting renal glycosuria. If there is little reduction in the output it is wiser to adopt more drastic measures and starve the patient for one or two days in order to get rid of the sugar from the urine. The diet should then be gradually increased according to any of the modern methods used in the treatment of patients with diabetes mellitus. If the sugar remains absent, or is very small in amount, cautious increase in the starch food may be made: 1 oz. of bread is added every second day up to 4 oz. This procedure may be modified if insulin is used; it is probable that 5 or 10 units of insulin will enable these patients to eat moderate amounts of bread without passing any sugar, or only a trace. When the urine contains no sugar treatment should be controlled by an occasional blood-sugar estimation.

True Diabetes Mellitus.

In all the conditions so far described the patient will not complain of symptoms ascribable to diabetes mellitus, and the sugar will usually be discovered by accident. A certain number of patients do, however, develop true diabetes mellitus, and it is the fear of this complication which makes the periodical examination of urine during pregnancy important. Patients with a severe form of the disease will complain of thirst, weakness, &c., and the diagnosis will be made because the patient consults her doctor for these symptoms. But patients with a mild form of the disease may not complain of any special symptom at first, and the diagnosis may only be made in the course of a routine examination. Once it is confirmed the patient must have the full régime of diabetic treatment with periods of starvation in order to keep the urine sugar-free and the blood-sugar normal. Here insulin will alter the accepted treatment considerably, since the starvation will probably be much abbreviated, if, indeed, it proves necessary. The question whether the pregnancy should be allowed to continue, or should be terminated, must be carefully weighed. It depends to some extent on whether the patient is near term. If she is near term it is better to treat the diabetes energetically and allow the pregnancy to continue normally. If, however, the disease has started early in the pregnancy it may be wiser to terminate it. All these statements depend on the severity of the attack and the response to treatment. The influence which insulin will play is probably considerable, and no pregnancy should be terminated without very careful consideration.

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Special Articles.

STUDIES ON THE PNEUMOCOCCUS.

TWELVE months ago we reviewed in these columns [1] a report from the Ministry of Health by Drs. F. Griffith and A. Eastwood [2] on the pneumococcus. The work detailed in this report has now been followed up by a further inquiry on the same subject by these two workers [3] prefaced by an introduction by Sir George Newman. In the first section on the influence of immune serum on the biological properties of pneumococci, Dr. Griffith takes as his starting-point the old conception of a pure culture of a bacterium as consisting of a number of absolutely identical individuals. This conception he considers to be erroneous and quotes in support of his view the recent work of Arkwright and of Benians on *B. dysenteriæ* and of Mary Cowan on the streptococci. Practically all recent work, in fact, emphasises this point—viz., that bacterial variation in a pure culture is distinguishable without there being any suggestion of a true transmutation of bacterial species. In other words, in spite of variation the pneumococcus is still a pneumococcus and not a staphylococcus or other organism. By growing different serological types of pneumococci in immune serum Dr. Griffith shows that when these types are cultivated on homologous serum, growth takes place in the form of clumps and long chains or gelatinous balls which deposit at the bottom of the tube; and that when this primary culture is shaken and plated, in addition to the normal type of colony, there appears on the plate subculture a variable number of colonies of size, appearance, and consistency different from the normal colony. The normal type of colony is referred to as S and the variant as R. A second passage through serum culture yields a larger number of variants from the normal, and a third passage finds the normal S form replaced by the R variant forms. Finally, after suitable subculture a stage is reached at which a single colony culture of either type, with some exceptions, breeds true. The normal S type of colony is circular and dome-shaped, with a smooth, shiny surface and an almost watery consistency. The variant or R type is a rough type of colony, dull or finely granular, and more coherent than the normal type. At first, also, the rough variant is generally smaller than the smooth normal colony. Both are equally bile-soluble. These changes, it should be borne in mind, are all produced by growing the serological types of pneumococci in cultures of homologous serum; heterologous sera appear generally to have no power of producing the rough variant colony from the smooth normal. The latter remain stable if kept virulent by passage through animals and growth in blood broth, whereas a rough variant after retaining its characters for many generations on blood broth may revert subsequently to the smooth type. Again, the smooth normal colony culture remains pathogenic for mice, whereas the rough variant shows a high degree of attenuation. Dr. Griffith quotes a smooth type killing in 0·000,000,01 c.cm. of broth culture and a rough variant from the same original strain having no effect in a dose of 0·2 c.cm. Finally, these two types of colony are shown to have different antigenic qualities. The S type produces in young broth cultures a soluble substance which the R colony does not, the former agglutinates with specific serum with a firm gelatinous precipitate, the latter produces loose clumps which are readily shaken up, whilst other immunological distinctions (e.g., with absorption) are also noted.

Dr. Griffith points out that here we have a definite morphological criterion for distinguishing between virulent and attenuated strains, and that immune sera should always be prepared entirely from S type cultures. The alteration from the S to the R type he considers to be a degenerative tendency present in many bacterial strains, and is therefore consonant with the work of other observers quoted at the beginning of our review. The S and R types possess related antigens but R lacks an antigen contained in S; witness the results obtained in absorption experiments. The author believes that an explanation of these phenomena can be found in the intimate association of the pneumococcus capsule with the existence of virulence. Briefly it is the outer portion of the pneumococcus which is modified in the change from smooth to rough type of colony—hence the latter loses the typical smooth, shiny surface and watery consistency and becomes dull and granular, whilst the individual cocci tend to adhere. This modification, it is suggested, is due to a substance soluble in salt solution which is not secreted in the attenuated R type of colony and which is intimately concerned with the virulence and capsule formation of the S type.

In the second part of this report Dr. Arthur Eastwood discusses the questions raised by his colleague's work of bacterial variation and transmissible autolysis and the relation of bacterial enzymes to bacterial structures. He points out that bacterial variation is no mere haphazard quality, but that it tends always to some one definite direction, and he shows how in the process of reproduction aberrant or variant forms may conceivably, on theoretical grounds, occur. Thus the transmissible lytic substance of the Twort-d'Hérelle phenomenon is not merely an agent for destroying bacteria but a method of producing bacterial variants. We are thus faced with the biological problems of variation and reversion to type, probably intimately bound up with questions of virulence. Dr. Eastwood sums up a most interesting and thoughtful memorandum by formulating a general statement that the constituents of living protoplasm have two functions: (1) a catalytic action which prepares food material by means of appropriate enzymes, and (2) a synthetic action by which new protoplasm is built up. He suggests that the balance between these two functions may be very finely adjusted and any disturbance of it may lead to the production of bacterial variants.

The Medical Research Council Report.

This report has now been succeeded by one from the Medical Research Council [4] which approaches the pneumococcus from the standpoint of the clinical pathologist, and the two together make a valuable study of this organism, pointing the way to the solution of many bacteriological and clinical problems which have hitherto made this subject the battle-ground of many inconclusive struggles. The first part of the report of Dr. E. E. Glynn and Miss Lettice Digby is concerned with laboratory technique in which the various modern methods of investigation are detailed—and their name is legion. No good purpose would be served by reviewing these in detail, but we believe the authors have maintained throughout a well-balanced perspective. We would, for our part, heartily endorse their opinion that bacteriologists, as a rule, make far too little use of low-power binocular lenses for plating and culture work generally. Bile solubility also is better tested with deoxycholate than with whole ox bile and can be controlled more readily with the microscope. We also confess to a deep sigh of relief to find that sugar fermentation tests are relegated to a relatively subordinate position. En passant it is becoming more and more urgently necessary for bacteriologists to agree on a more or less standardised method for estimating hæmolysis of blood media. But these are merely technical points, and for most readers the main interest of the report will lie in fresh light it throws on the various bacteriological aspects of

[1] THE LANCET, 1922, ii., 623.
[2] Reports on Public Health and Medical Subjects. No. 13. H.M. Stationery Office. 1922. 2*s*. 6*d*.
[3] Reports on Public Health and Medical Subjects. No. 18. H.M. Stationery Office. 1923. 1*s*.
[4] Bacteriological and Clinical Observations on Pneumonia and Empyemata, with special reference to the Pneumococcus and to Serum Treatment. By Ernest E. Glynn, F.R.C.P., and Lettice Digby. Published for Medical Research Council by H.M. Stationery Office. 1923. 5*s*.

pneumonia; 140 cases of pneumonia and 50 of acute empyema were investigated by the authors, as well as saliva from normal controls and a group of miscellaneous pneumococcal and streptococcal infections. The authors found that in the case of sputum or saliva the mouse inoculation test yielded the most certain results for the finding of pneumococci, whilst streptococci, on the other hand, usually came out best on direct plate cultures. Lung-juice cultures obtained by means of exploratory puncture with a 10 c.cm. record syringe and a medium needle are advocated as a safe and valuable aid to diagnosis. In adults 45·1 per cent. and in children 61·5 per cent. examined in this way yielded positive results and afforded a reliable guide as to clinical prognosis, the mortality amongst positive cases being 50 per cent., as against 9·1 per cent. in the negative cases. The blood culture findings were equally striking, 45 per cent. showing positive results with a mortality of 71·4 per cent. in the positives and 8·3 per cent. in the negatives. The authors also isolated 23 strains of intermediate pneumo-streptococcal strains. Most of these were eventually assigned to one or other group but five strains remained definitely unclassifiable, their colonies being intermediate in character, their morphology generally diplococcal in serum broth and other crucial tests equivocal. These so-called intermediate pneumo-streptococcal strains are a source of much confusion in all bacteriological investigations made via the mouth, and chronically enlarged tonsils in our experience are particularly liable to harbour them. It is interesting to note that in the report under consideration a larger number of these intermediate types were ultimately classified as pneumococci then as streptococci. Whether or not we are encountering here the question of bacterial variation it is impossible at present to say, but the question is worthy of detailed investigation.

Space does not admit of a discussion of the various points raised with reference to the typing of the pneumococci, the classification of streptococci, and the identification of the numerous other organisms isolated from these pneumonia, empyema, and miscellaneous infections, but the question of clinical and bacteriological correlation cannot be passed over. In the empyemata of young children the Type I. pneumococcus cases were more often secondary to pneumonia than the Group IV. pneumococcus and the streptococcus cases. Also on the average the Type I. pneumococcus cases had a higher temperature and in the recoveries a shorter illness than the others. Amongst the pneumococcal pneumonias onset with rigor and termination by crisis was commoner with the Type I. cases than with Group IV. cases, whilst the temperature of Type I. cases was of shorter duration, more often continuous, and the sputum more often rusty than in Group IV. cases. It would seem, therefore, that Type I. pneumococcus produced the more typical clinical type of case, and this may not be without bearing on the larger bacteriological issue when we consider the fact that Group IV. pneumococcus is such a heterogeneous collection. It was also further noted that cases beginning with rigor had a heavier plate incidence of pneumococci than those whose onset was gradual. We cannot but regard this correlation of clinical and bacteriological findings as extremely valuable, as it is by means such as these that diagnosis becomes an accurate business. Indeed, reviewing these and other acute infective diseases of known bacterial origin we should say that the most notable advances made of recent years have been in the direction of rendering diagnosis more accurate, and in the long run more efficient treatment must surely follow. The authors of this report conclude by pointing out that the mortality from pneumonia, excluding influenza, is slowly increasing in England and Wales and is now greater than that from phthisis. To quote their concluding sentence: "A systematic investigation, by standardised methods, at a few centres in Great Britain, of the flora of normal mouths and of bronchitic and pneumonic sputa would furnish valuable information regarding factors governing the incidence of, and mortality from, pneumonia and influenza."

VITAL STATISTICS FOR 1921.

THE REGISTRAR-GENERAL'S REVIEW.

(*Continued from p. 582.*)

Causes of Death.—The first causes of death considered in the Review are the acute infectious diseases. Among these *enteric fever* is rapidly becoming a disappearing disease. In 1921 it was responsible for only 613 deaths, as compared, for instance, with nearly nine times this number in 1890 in a much smaller population. The death-rate in 1921 was only 16 and in 1920 was only 14 per million of population, the lowest figures hitherto attained. It was much higher in the north of England than elsewhere, and, strangely enough, was slightly higher in the aggregate rural districts than in London.

Fatality of Certain Infectious Diseases.—On page 40 is an interesting table showing the case-mortality of some of the chief infectious diseases. The rates are given with reserve, owing to possible defects of notification, and because in the case of small-pox the number of cases is too small to have significant rates based on them. Between 1911 and 1921 the case mortality of enteric fever varied between 15·8 and 20·6 per cent., of scarlet fever between 0·95 and 2·0 per cent., of diphtheria between 7·2 and 10·9 per cent., while that of small-pox (subject to the above-mentioned warning) varied from 1·6 to 42·9 per cent. The corresponding percentages for poliomyelitis and meningococcal meningitis indicate defective notification of cases.

Measles.—The figures for measles are regarded in the Review as indicating the possibility that "a new era in this disease may have opened." Stated in terms of the population at ages under 15 years, the death-rate from measles in 1921 was 206 per million, and the rate in 1920 was less than half the rate for any year prior to 1916. (To pursue this comparison another volume than the one under review needs to be consulted; the result only is stated in this volume.) For two years in alternation the death-rate from this disease has been unprecedentedly low, with a low rate between these two years. It may be hoped that increased attention to child life and the growing efforts to visit and nurse cases of this disease are beginning to show their effect.

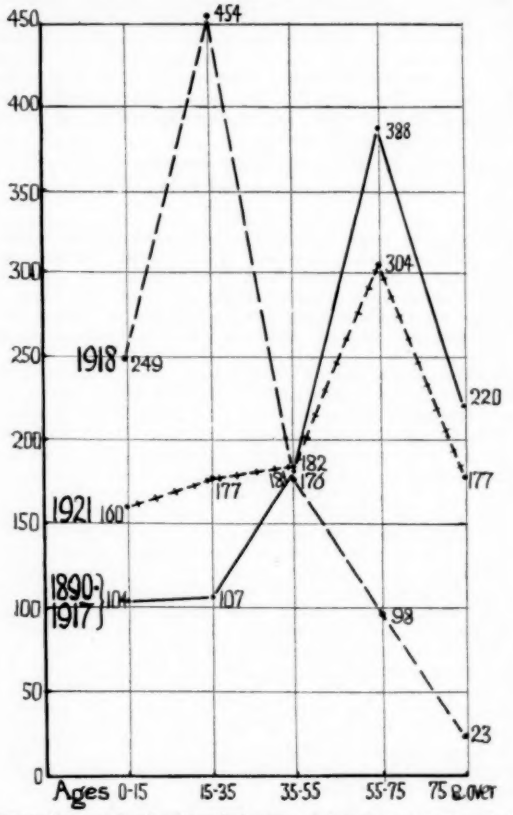
Scarlet fever has become a relatively innocent disease, so far as concerns death. In London it was prevalent three to four times as much as in rural districts, with a rather lower fatality.

Diphtheria shows much activity. From 1891–95 to 1911–15 it had declined, but this process has now ceased.

Influenza.—This disease at the outset of the great epidemic of 1918 underwent a sudden and remarkable change in the age incidence of its death-rate which has not been satisfactorily explained, and which, owing to its international distribution, can only be partially elucidated by the events of the great war. Although this cannot be discussed here, it is important to note, as shown in the following diagram, that the age distribution of influenzal mortality is steadily reverting towards the earlier type. In Fig. 1 the proportions of deaths at five periods of life are given for 1890–1917, for 1918, and for 1921, for females only, to permit of comparisons during the war, and standardised for age distribution. The extraordinary change in age incidence of mortality in 1918 is seen, and the reversion towards the earlier type in 1921.

Decline of Mortality from Tuberculosis.—This section contains the most complete review of the historical course of the death-rate from total tuberculosis, and from pulmonary and from non-pulmonary tuberculosis in this country which has hitherto been published. The death-rates from each of these forms of tuberculosis are given and the death-rates at all ages in the aggregate are standardised; in this way the differences due to varying proportions of

FIG. 1.



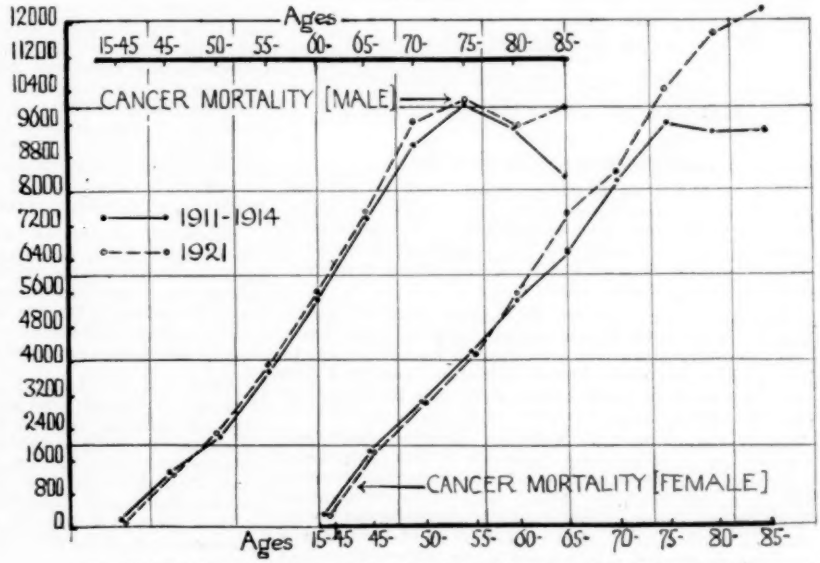
Proportions of deaths from influenza of females at five periods of life during 1890–1917, 1918, and 1921.

persons living at various ages being eliminated. Death-rates are given for each year from 1851 onwards, and summarised death-rates for decennial and for quinquennial periods. Attention was drawn in a recent issue[1] to the difficulty in interpreting statistics of various forms of non-pulmonary tuberculosis in infancy. As a large part of non-pulmonary tuberculosis occurs in infancy, the figures for pulmonary tuberculosis must be regarded as on a higher plane of certitude than those for total tuberculosis. Even for pulmonary tuberculosis in certain years there may be divergences from the usual course of events. This was to an exceptional extent the case during the great war, and following that in the great influenza epidemic of 1918–19, when the falling death-rate from pulmonary tuberculosis was replaced by an increasing death-rate which reached its maximum in 1918. The special causes for this increase and its distribution in certain special age-periods are discussed in other official reports by Dr. Stevenson. Here we are concerned solely with the general course of events, which has been resumed now that the disturbances caused by war and by influenza have disappeared.

Curves for total tuberculosis, given in the Review, show a surprisingly constant decline during the whole period 1866–1914, and this position has been resumed in 1920 and 1921. This constancy, as is pointed out in the Review, is not in the rate of fall, which has been increasing, but in the actual amount of fall. To bring out this point the course of events is charted not only for actual rates, but also on a logarithmic scale, thus enabling changes in death-rates and in rates of fall to be readily compared. With pulmonary tuberculosis the trend of events for males has been similar to that for total tuberculosis, the rate of fall having been consistently on the increase, while for pulmonary tuberculosis in females a particularly rapid fall was experienced from 1890 to 1896, while since then there has been some falling off in the rate of decline.

The decline in the death-rate from tuberculosis may be regarded as the resultant of forces, some of which tend to increase and others to reduce it, and the fact that the rate of decline has not increased so rapidly as may have been anticipated in view of the active anti-tuberculosis measures of recent years, gives ground when duly considered for encouragement. Even a stationary death-rate from tuberculosis, having regard to the increasing complexity of modern life, to the great increase of human communications, to the replacement of country by town life, to the increase of indoor and sedentary as contrasted with outdoor occupations, might reasonably be regarded as evidence that the improved hygienic habits of the people, the diminished amount of indiscriminate spitting, the improved nutrition of the population, the more successful treatment of the disease, and the hospitalisation of a large proportion of advanced and acute cases, in conjunction, are telling on the total mass of the disease. But instead of a stationary death-rate, we find that the death-rate from tuberculosis continues to decline, and so far at an increasing rate. There is every reason therefore to pursue active measures on all known lines of prevention of treatment, while welcoming any advances in therapeutics or in preventive measures

FIG. 2.



Age distribution of cancer mortality in males and females, 1911–1914 and 1921.

[1] THE LANCET, Sept. 15th, p. 575.

that experience or scientific research may render available.

Cancer.—This disease now bulks more heavily in the death returns than tuberculosis, 46,022 deaths—20,649 of males and 25,373 of females having been returned—as cancer, as compared with 42,678 from tuberculosis—22,899 of males and 19,779 of females. In Fig. 2 is shown the course of the age distribution of cancer mortality in males and females, and it will be seen that after 45 for males and 60 for females the rates for every age-group are higher in 1921 than in 1911–14, while below these ages they are lower.

The partial shifting of the stress of cancer mortality towards the latter end of life, which remains when all fallacy caused by the greater number of survivors at these ages has been eliminated, is not peculiar to English experience. In recent returns for New Zealand, for instance, attention, we are informed, has been drawn to this change.

Among other interesting details as to the distribution of cancer, special attention should be drawn to the remarkable differences in the incidence of fatal cancer of the genital organs according to marital condition. Standardised death-rates being unavailable for this comparison, the relative excess of deaths from cancer of each genital organ over that for deaths from all causes is given, according to age, and in married and widowed women as compared with single women. There is excessive mortality among the married from uterine cancer, occurring chiefly in the reproductive period, and reaching its maximum of 210 per cent. at ages 35–40. Along with this goes the fact that the uterus is the only important seat of primary cancer mortality in which cancer does not appear to be increasing, a result which might be expected, in view of the lowered birth-rate, if injuries in childbearing have any relation to excess of cancer. On the other hand, cancer of the ovaries and Fallopian tubes shows as great a predilection for single women as uterine cancer for the married, but this excess only slowly emerges during the childbearing period. So also with mammary cancer, the excess from this form of cancer in the unmarried increases rapidly after the childbearing period. The complete significance of these important facts will be better seen when it becomes practicable in a later report to give death-rates for each age-period and for each variety of cancer. That they will be found to have much bearing on preventive medicine cannot be doubted.

The entire report calls for detailed study by all who are interested in medicine, either in its curative or its preventive side.

THE MEETING OF THE BRITISH ASSOCIATION.

SECTION OF PHYSIOLOGY.

THE papers read at this section may be divided, for purposes of description, into three classes—medical, pure physiological, and theoretical. Prominence is given to the contents of the papers in accordance with this order, though a strict demarcation of subject-matter is not actually possible.

The presidential address by Prof. G. H. F. NUTTALL, F.R.S., dealt with Symbiosis in Animals and Plants, and naturally attracted a large audience of botanists. The address was very broad as well as deep, and does not lend itself to abstraction, as it was developed in considerable detail.

In a paper on the Relation between Diet and Cancer, Dr. S. MONCKTON COPEMAN, F.R.S., developed a hypothesis which rests on the idea that since cancer tissue is of juvenile type, and since fat-soluble A-vitamin is more essential for the nutriment of young than of adult tissues, that reduction of the vitamin-A content of the diet might exert some differential effect on the growing tumour.

Dealing with the subject of Dental Caries at Porto Santo, Dr. MICHAEL C. GRABHAM stated that the natives of this island are almost immune from caries, and suggests that this is due to some constituent of the highly mineralised water. The teeth of the district are characterised by the appearance of a thin yellow line across the upper incisors, and in later life this stain spreads and stains the teeth generally. It is, he said, not seen in Madeira.

Prof. J. M. BEATTIE dealt with the

Action of Finely-Divided Particles of Slate on Toxins.

The work started from the observation that workers in slate quarries did not suffer from rheumatism, although they often had bad teeth. It was an established fact that certain substances, such as asbestos, could destroy toxins *in vitro*, and extension of these experiments showed that the same property was possessed by finely-powdered slate, 2 g. of which could destroy 10 lethal doses of diphtheria toxin, if the slate was sufficiently finely divided. The action is effected in a few minutes, and the toxin is absent from the slate itself as well as from the supernatant fluid. Although other fine siliceous powders such as kieselguhr, clay or silica, can do the same thing, the presence of silica is not essential to the reaction, which can also be effected by a variety of other finely particulate substances such as charcoal, bismuth salts, &c. The use of these two last-named substances in dyspepsia is of interest, and it was suggested that by adsorbing the toxins, the bacteria were rendered inert and were more easily destroyed. Hæmagglutinin, agglutinin, and complement were also adsorbed by slate, and live bacteria mixed with slate dust were rendered non-lethal, in spite of the fact that live bacteria could still be recovered from the site of injection of the mixture. The antigenic power of serum was unaltered by slate, a fact which might perhaps find some further application, for it enables us to remove the toxic substances without destroying the antigenic properties.

Prof. H. E. ROAF described a method for

Measurement of Colour-Blindness in Terms of Wave-lengths,

which is certainly recommended by its simplicity. The subject is given a standard diagram in colours, which he is told to fill in on a blank; the diagram is then examined, together with the standard, by viewing them though coloured screens which cut off certain wave-lengths. When a match is found the deficiency of the patient's vision, as compared with the observer's, is given by the wave-lengths of light absorbed by the viewing screen which gives the match. Colour-blind subjects fell into three groups, of which the first was deficient at the red end, the second up to the sodium line of the spectrum, and the third up to the violet end—i.e., was totally colour-blind. Dr. F. W. EDRIDGE-GREEN, in a paper on the effect of the blood of the retina on colour matchings, pointed out that this must be allowed for in comparing colour matchings of foveal with marginal parts of the retina.

A most ingenious recording kata-thermometer, devised for Prof. L. HILL by Dr. E. SCHUSTER, was demonstrated by Mr. T. C. ANGUS. This instrument allows of a graphic record being made to show the rate of cooling in the air, and should prove very useful for the investigation of ventilation problems by the use of the kata-thermometer.

Prof. J. J. R. MACLEOD, of Toronto, gave a popular lecture on Insulin and its Value in Medicine,[1] which was attended by a large audience in the Picton Hall. Most of the subject-matter will be familiar to those interested in the subject, but it is worth mentioning that Prof. Macleod laid stress on two points of some current interest in connexion with recent claims. One is that there is at present no evidence that insulin can produce any of its effects when given by the mouth.

[1] THE LANCET, Sept. 22nd, p. 591.

The other point is that since we do not know the exact chemical nature of insulin, except that it is a very complicated substance, any hopes of synthesising the principle are doomed to disappointment, at least for a long while to come.

Some Pure Physiology.

Papers of pure physiological interest comprised one by Prof. H. ZWAARDEMAKER, of Utrecht, on Bioradioactivity, or the importance of potassium and other radioactive elements in the life of the cell, and one by Prof. R. MAGNUS, also of Utrecht, on the effect of carbon-dioxide on the lungs; he showed that carbon-dioxide in physiological concentrations, and in presence of extremely minute amounts of adrenalin, causes dilatation of the bronchioles and pulmonary vessels, thus facilitating the inlet of air and the circulation of blood through the lungs. Prof. RAMSDEN and collaborators read papers, and showed very pretty demonstrations dealing with various phenomena in physical chemistry. A somewhat similar subject was dealt with in a joint discussion with the Chemistry Section on the Physical Chemistry of Membranes in Relation to Physiological Science. The discussion was opened by Prof. ROAF, who gave an account of some important phenomena in physiology in which membranes played a part, or might possibly have to be considered as playing a part.

Prof. F. G. DONNAN then gave an account of the physico-chemical aspect of membranes, and expressed the opinion that much of this part of physical chemistry had only a remote bearing on physiology, because in the past it had dealt with states of thermo-dynamic equilibrium. He said that the activities, and indeed the very existence, of a living organism depend on its continuous utilisation of an environment that is not in thermo-dynamic equilibrium. A living organism is a consumer and transformer of external free energy, and environmental equilibrium means non-activity and eventual death. It was, indeed, a pleasure to hear such a distinguished physical chemist express views so broad and so sympathetic to biology, and gave one to hope that the omniscience of the physical chemist is a thing of the past generation.

Other papers of pure physiological interest were contributed by Dr. S. C. BROOKS on Electrolytic Conductance of Micro-organisms; Dr. W. W. WALLER on Red Blood Corpuscles under the Microscope; Prof. C. LOVATT EVANS on the Contraction of Plain Muscle; Prof. ROAF on the Mechanism of the Cochlea, and on the Oxygen Content of Methæmoglobin, which he, with Buckmaster, believes to be only half that of oxyhæmoglobin; Mr. J. C. WALLER on Photo-electric Currents in Leaves; Prof. J. S. MACDONALD, with Dr. F. A. DUFFIELD, papers and a demonstration on the Energy Cost of Cycling; Prof. J. S. MACDONALD, with Miss MARGARET MACDONALD, Mr. GEORGE MACDONALD, and Dr. T. W. WADSWORTH, on the Physiology of Walking. There was also a paper by Mr. WATSON-JONES on the Metabolism of the Frog at Different Temperatures.

The meeting was well attended, the local arrangements were excellent, and on the whole it was the best meeting of the section held since the war.

SECTION OF ANTHROPOLOGY.

In this section the presidential address by Prof. P. L. NEWBERRY showed that in the delta of the Nile, long before Menes, the first king of Upper and Lower Egypt, there had been a contact of races from Lybia on the one hand and Asia Minor on the other, with the autochthonous predynastic peoples. From this contact arose the Egyptian civilisation. Research is proceeding which may elucidate the relative importance of the various elements. In a further paper Prof. Newberry drew attention to the importance of studying the origin of the domesticated animals and plants found in Egypt. There were evidences that the cereals came from Syria, but many weeds seemed to come from farther East. The goat was probably responsible for the disappearance of the olive by eating the shoots of young plants, while the camel, by close cropping, drove away the antelopes, and so the carnivora who preyed on them. In the discussion Prof. G. ELLIOT SMITH suggested that barley really came from Somaliland, and indicated an infiltration of civilisation from the south rather than the north. Further research is proposed, and any evidence of the nature of weeds associated with cereal crops might be of great assistance.

Prof. SOLLAS, of Oxford, read a paper on the evidences of Miocene Man, derived from certain flints from the province of Cantal in France, found in deposits of Pontic age on the rocks of the Miocene and Pliocene periods. In certain cases, as for example, in the Hastings beds at the base of the Eocene, erosion of underlying formations may lead to such pressure on flint pebbles that they flake in a manner similar to that produced by human agencies, and these flakes may deceive the very elect, but in this instance the formation was such that, so far as Prof. Sollas can see, all non-human agencies can be excluded. If true, this greatly extends the history of an intelligent precursor of homo sapiens on the earth, and goes far to confirm the views of Sir Arthur Keith.

Sir ARTHUR EVANS gave an account of his recent work at Knossos, showing the origin of a road from the palace gates which passes to the south of the island, facing Africa, so that navigators could reach Africa without passing the dangerous capes at the ends of the island. This may explain the mutual relations of Minoan and Egyptian cultures, if not even some intermingling of races.

Dr. KRUYT described a stone-using people of Central Celebes, who erected menhirs to their dead and were acquainted with bronze. They preserved the bones of the dead in pots they named "vessels," indicating a former intention and perhaps practice of sending the dead home for burial. This has a bearing on the theories of race or culture dispersal from a point on the European border.

Mr. W. E. ARMSTRONG pointed out that on Mossel Island there was a ceremonial consumption of one or more persons on the death of a chief. Sometimes the victim offers himself voluntarily; at other times force must be used or strangers used for the purpose. There is also a peculiar form of pseudo-marriage, in which a woman, owned by several men unable individually to support a wife, is let out on hire on festive occasions for the benefit of the partners.

Mr. W. BONSER, in a study of the magic practices of the Finns, showed these people had Eastern and not Western affinities. The shaman was only able to perform after working himself up into an hysterical stage, and the office was hereditary in a few families.

Prof. FLEURE reviewed the pre-history of Wales, showing the survival of ancient types, and Dr. WHEELER indicated from a study of hill forts how incomplete had been the Romanisation of the Principality.

INDIGENOUS SYSTEMS OF MEDICINE IN INDIA.

REPORT OF THE MADRAS COMMITTEE.

OUR Madras correspondent has given the conclusions arrived at by a committee appointed by the Madras Government to consider the recognition of Ayurvedic medicine in the Presidency.[1] The full report, signed by all the members of the committee, is now available; it is moderately brief, but is wholly based on a very cleverly written memorandum on "The Science and the Art of Indian Medicine," prepared by Dr. Srinivasa Murti, the secretary. This memorandum is published along with the main report, and occupies 96 printed foolscap pages, as compared with the 44 pages of the report, and it will not promote the encouragement of the indigenous systems.

[1] THE LANCET, 1923, i., 1231.

Dr. Murti's Conclusions.

Dr. Murti claims to have studied the Indian systems of medicine from the two necessary standpoints, viz.: (1) as a science, and (2) as an art. To begin with his conclusions, they are: (1) The Indian systems are undoubtedly scientific, and their general principles and theories are quite rational and scientific; (2) as an art and as practised at present Indian systems are not self-sufficient, because while they are self-sufficient and efficient in medicine, in surgery they are not.

Six long chapters, some of which contain much irrelevant matter, follow, viz.: (1) Scientific methodology; (2) subjects of preliminary scientific study—the panchabhuta theory; (3) physiology and anatomy—the thri-dhatu theory; (4) ætiology and pathology—the thri-dosha theory; (5) diagnosis and treatment—the rasa-guna-veerya-vipaka-prabhava pharmacology; and (6) Indian systems judged from the standpoint of art.

Science and Mysticism.

It is clear that Dr. Murti depends far too much on the opinions of European "authorities," who would be more correctly called "cranks" in European scientific circles. The line of thought appears in this sentence: "Every system of Hindu thought is at once philosophy, science, and religion, all in one, and one in all." It is always urged against criticism of Ayurvedism that the critic must first learn Sanskrit, then study Ayurveda for several years, and become imbued with the spirit of Hindu philosophy before he can deliver any judgments. If the upholders of Western medicine agreed to this, Ayurvedism would stand practically unassailable. If the professors of Ayurveda intend to incorporate mystic rites with religious ceremonies and Vedic texts, and to maintain that the outcome is a system of medicine, they must remain a cult apart. Dr. Murti's statement that "it is quite as scientific for Ayurvedists to assume the truths of Samkhya and the like as it is for the student of Western medicine to assume the truth of modern physics and chemistry," traverses too much accepted knowledge to make communion possible.

In the chapter on "Preliminary Scientific Study in Ayurveda" an attempt is made to prove that European and Hindu theories of matter are in very close agreement, and that the modern conception of the atom finds its parallel in Hindu scientific thought from the commencement. It is also stated that the original propounders of such theories as that of the evolution of the atoms were persons endowed with immense ranges of vision, because the old Hindu gurus or teachers, "by improving their own internal organs of sense," could extend their range of perception to any desired degree, even to perception of an atom. The microscope and other scientific instruments cannot be thus set aside.

Ayurvedic "Humoral" Theory.

In the chapter on physiology and anatomy further attempts are made to show that modern physiology is gradually coming round to the ancient "humoral" Ayurvedic theory, and that "hormones" and "enzymes" are merely new words for "special chemical complexes," which were thoroughly understood and worked out by the ancient physicians of the indigenous systems. But the mysterious "humours," called Vata, Pittha, and Kapha, must pass through modern physiological laboratories before it can be claimed that these "dhatu-triads" correspond exactly to the catalysts, enzymes, hormones, and other activating agencies of modern Western physiology. Dr. Murti, enthusiastic as he is, seems to hesitate before making the claim, and merely pleads for an understanding study of the ancient Ayurvedic physiology. In anatomy it is admitted the loss has been very heavy, all original works having been lost, and later writers did great harm to Ayurvedic literature by burdening their writings with a "fanciful anatomy" of their own invention.

The chapter on ætiology and pathology is written in the same frame of mind. It is stated that Ayurvedists hold that the only ways in which the body could be invaded are through the mind and senses; hence the subjective Ayurvedic classification of causes of disease is complete and comprehensive, whilst that of modern medicine, which states that invasion of the body is carried out by external agencies of disease, is only objective and therefore imperfect. As regards the bacterial causes of disease, the memorandum goes rampant, quoting, for instance, Sir James Goodhart's Harveian oration for 1912, "even bacteria are probably results and not causes," and pleading that the Ayurvedic thri-dhatu (humoral) theory is what modern research is being driven to recognise, and that there seems to be an essential similarity, if not identity, between the two modes of thought.

Indian Methods of Diagnosis.

Ayurvedic diagnosis of disease is carried out by means of the five senses and by interrogation, whilst examination of pulse and urine have received considerable attention. Some Ayurvedic practitioners even claim that sex, pregnancy, &c., can be diagnosed by examination of the urine, and this claim is supported by the assertion that "if it is possible to diagnose pregnancy by the presence in the blood of an enzyme capable of digesting placental proteins, why should it be impossible to diagnose the same by an examination of the urine?" The method of examination to be adopted is not mentioned, but in any case the above quotation is an illuminating sidelight on the attitude adopted by Dr. Murti, himself trained and qualified in Western medicine.

In the section on treatment it is stated that Western-trained medical men often failed because they did not possess the key to the diagnosis of the *patient*, though they were quite correct in their diagnosis of *disease*. Western medicine apparently has no means of recognising a patient's *prakriti*, or inherited constitution, but acts more or less blindly, and learns from the bitter experience of its patients. Why this prejudiced assertion is made without any proof is not stated, but it again illustrates the writer's mentality. Dr. Murti adds that the category of thadarthakari remedies (a series which produce the same condition as the cause of the disease itself) is wide enough to include all forms of vaccine therapy known to Western medicine. Hence, it is presumed, the promiscuous and dangerous use made in India to-day of all kinds of serums and vaccines! Dr. Murti admits that Ayurvedic diagnostic methods are mostly clinical in contra-distinction to the laboratory methods of Western medicine, but ends by pleading for "a harmonious and judicious combination" of the two. It is impossible to follow him when he maintains that it would be dangerous and even disastrous for a Western medical man to use Ayurvedic remedial measures without an understanding of the principles of Ayurvedic pathology. There can surely be only one scientific system of pathology. Again, the statement is made that "various kinds of vaccines are made from fæces, urine, expectoration, and foul matter from pathological secretions and excretions of various kinds." This statement is used to ridicule the British Pharmacopœia, but Ayurvedists themselves give crushed gall-stones as a medicine and have been known also to prescribe "fresh urea" in the form of cow urine.

Self-sufficiency of Ayurveda.

Finally, under the heading "Is Ayurveda self-sufficient at present?" it is admitted that it is necessary to utilise the services of the Western system in the branches of medicine, surgery, midwifery, ophthalmology, medical jurisprudence, bacteriology, and anatomy; and the stethoscope, the microtome, X rays, polygraphy, the electroradiograph, the cystoscope, &c., are all to be made use of, as is electrical or radium therapy, quinine, emetine, and antimony. "It cannot be that water is H_2O in the west and something else in the east." This fatal

admission, made by Dr. Murti, refutes all the laborious arguments he has made, for if water is H_2O in both east and west, can scientific pathology and physiology differ in the two hemispheres? At present the Ayurvedists admit they have neither teachers nor text-books with which one would expect them to place their system of medicine on a scientific footing. This note cannot be concluded in any better way than by quoting another sentence from the memorandum: "In so far as the one common ideal of all systems of medicine is the preservation of health and the prevention or cure of ill-health, there can really be but one system of medicine"; but that this is not a widely-accepted opinion among Ayurvedists appears from a recent letter to the press from an Ayurvedic physician, who states that "absolute fusion can never be achieved, for Ayurveda will never consent to lose its characteristic of thinking in terms of its own peculiar religious philosophy of Satwa Rajas and Tamas."

No Hope of Fusion.

There can be no hope of fusion with modern scientific advance so long as this opinion is held. The same writer tries to answer the argument that the Government cannot be asked to place the Ayurvedic systems on a definite footing until they have put themselves in a position which can be recognised as a body and a teaching profession, by pleading that the present obnoxious rite of vaccination could never have survived against the attacks of very able exponents of Western medicine unless it had been bolstered up by Government. This is the level of argument used, and the ignorance displayed, by one of the ablest exponents of the Ayurvedic systems. No Government recognition should be given until the Ayurvedists are prepared to come out into the open, to produce a syllabus for teaching, and to state their methods for the treatment of diseases, so that the scientific world may have some definite proposition to work upon.

INSULIN MEDICATION:
A COMPENDIUM OF EXPERIENCES.

RECENT issues of the *Journal of Metabolic Research* contain numerous papers by different workers in Canada and U.S.A. who have all been working at the treatment of diabetes mellitus with insulin. Vol. II., Nos. 5 and 6, though dated November and December, 1922, contain papers which were received for publication as late as May, 1923; this makes for some confusion. All the workers agree as to the great value of insulin, but they differ widely as to the best method of using it. They may be divided into two schools just as the English workers are—those who aim at keeping the blood-sugar normal, and those who pay most attention to the clinical condition and do not mind if the blood-sugar is raised. F. G. Banting, W. R. Campbell and A. A. Fletcher, and F. M. Allen and J. W. Sherrill agree that the fasting value of the blood-sugar should be kept as near normal as possible. E. P. Joslin, R. M. Wilder, J. R. Williams, R. Fitz, H. Geyelin, R. T. Woodyat, and their co-workers all seem to agree that the clinical condition comes first and that the blood-sugar is a secondary matter.

The manner in which the diet has been arranged also differs considerably. Most workers have been using a diet arranged according to Woodyat and Shaffer's principles of the aketogenic ratio and to the basal metabolism. Allen has been using the latest modification of his method which differs considerably from the original method which is still in use in this country. The end-stages of his two plans do not differ very much from each other. The actual amount of carbohydrate which has been given by the different workers has varied, considerably. The dosage likewise has been varied, and it has been necessary in most cases to give two or three doses in the day before the meals at which carbohydrates have been eaten. The following special points demand attention.

Recovery of Tolerance.

Banting, Campbell, and Fletcher point out that recovery of tolerance occurs in some cases, which render the work of estimating how many grammes of carbohydrate are looked after by 1 unit of insulin quite misleading. Especially good results are reported with three children; in one case the blood-sugar was kept at the normal level, but in the third there was no increase in sugar tolerance, although the child had nearly doubled her weight. They lay stress on the fact that while the diet may be increased to any desired amount provided sufficient insulin is given and the patient kept aglycosuric the proper balance of protein-fat and carbohydrate cannot be neglected; also, that rest for a weakened organ is a fundamental principle of therapeutics, and that efficient rest may be achieved by the use of insulin and thus give a chance of recovery of sugar tolerance. Patients with septic conditions can take big doses of insulin without showing the signs of hypoglycæmia.

Diabetic Coma.

The treatment of diabetic coma is specially dealt with by Campbell, who comments on the whole question of ketosis. He believes that large quantities of sugar should be given to patients in coma together with large doses of insulin in order to ensure that hypoglycæmia does not occur. The results of such treatment in his hands have been very satisfactory. Fletcher and Campbell have a separate paper on hypoglycæmia and its complications. They found that the level of blood-sugar at which symptoms occurred varied in different persons. Some patients had symptoms when the blood-sugar was only 0·08 per cent., whereas others could tolerate a blood-sugar of 0·06 per cent. without any inconvenience. A good account of the symptoms of hypoglycæmia is given. The first symptom is often nervousness followed by excessive hunger or inertia. This is followed by sweating and pallor, and in children the pulse rate is increased. At a later stage tremor is present and there is a loss of the fine movements of the hands. Aphasia, both motor and sensory, may occur together with great excitement. Syncope may occur and the patients may become unconscious, but no patient has been observed in convulsions. The clinical picture is sufficiently alarming but the symptoms can be relieved very easily. Sugar will at once stop them, but orange-juice and hot tea or coffee will also relieve the subjective symptoms. In emergency a dose of adrenalin, 10 or 15 minims, seems to work instantaneously, but should be followed by a little sugar.

Wise and Foolish Patients.

E. P. Joslin, H. Gray, and H. F. Root report good results with 87 patients, and they emphasise the point that insulin is a remedy for the wise patient and not for the foolish one. The patients usually gained weight under treatment, and they raise the question whether this gain in weight is a sign of any recuperation of the pancreas. The results were equally good whatever the age of the patient. One girl, aged 12, who had only been ill 32 days made a rapid recovery. She had a normal fasting blood-sugar with only 3 units of insulin a day and was able to eat 155 g. carbohydrate. Joslin does not accept the view that the fasting blood-sugar must be brought down to normal at all hazards. He gives an excellent list of rules for patients, and one of the most important is "If your supply of insulin fails reduce your diet by one-third."

The Effects of Dextrose and Lævulose.

R. M. Wilder, W. M. Boothby, C. J. Barborka, H. D. Kitchen, and S. F. Adams report good results with 40 cases treated with insulin. As the insulin in the early stages was irregular in potency a scheme for its standardisation on patients was worked out. They found that if the protein of the diet was increased up to 3 g. per kilo, keeping the caloric and carbohydrate value of the diet constant, the insulin had less effect. Insulin would rapidly cause a patient who was losing nitrogen to gain nitrogen. They do not consider it essential to bring down the blood-sugar to normal.

The basal metabolic rate was unaffected by insulin. Experiments were made with equal amounts of dextrose and lævulose with and without insulin. Lævulose caused a small rise in the respiratory quotient (R.Q.), even when no insulin was given, while after insulin, although both caused an increase, that produced by lævulose was much greater. The specific dynamic action of the two sugars was equal, but the blood-sugar was less raised after lævulose. The authors suggest that the insulin brings the sugar into a reactive form which is more available for oxidation and polymerisation. Further, that it is the position of the C.O. group in lævulose which is responsible for the latter sugar being better used than dextrose. J. R. Williams reports the results of four cases, one of which was very severe. The results were very striking, but there was no sign of any recovery. He advises 2–3 injections a day as being less likely to cause severe reactions. He is doubtful whether the dose of insulin will not have to be increased. He also considers that the blood-sugar should be kept higher than is customary when no insulin is given. R. Fitz, W. P. Murphy, and S. B. Grant report observations on the R.Q. before and after insulin. They found that it rises considerably as the result of the insulin and does not fall again until some days after the insulin has been discontinued. The effect of insulin in bringing the patients into nitrogen equilibrium is very striking. The fasting value of the blood-sugar was above normal in their cases. H. Geyelin, G. Rawle-Harrop, M. F. Murray, and E. Corwin reproduced photographs of three children before and after treatment with insulin.[1] They show the striking improvement which takes place when sufficient food is given. The children all had high blood-sugars and passed sugar before the insulin injections. R. T. Woodyat thinks that it is better to give only one dose in the day. He does not consider that it is essential to aim at bringing the fasting blood-sugar down to normal. One profoundly under-nourished man developed hypoglycæmia after insulin, and although he was given sugar and had hyperglycæmia he did not regain consciousness.

Observations on 161 Patients.

F. M. Allen and J. W. Sherril publish a long account of their work on 161 patients, many of whom had been under observation for a long time. They have been treated on the lines familiar to those who know Allen's work. Certain facts stand out among the mass of detail. Allen believes that the aim of the physician should be so to use the insulin that the fasting blood-sugar should be normal. He gave three instances in which patients were treated on different lines, and shows the dangers of discontinuing the insulin suddenly. The three patients all became ill, but the symptoms of coma were very anomalous and would not have been detected unless the blood had been examined for sugar and acetone bodies. The authors do not think that it is possible in every case to bring the blood-sugar down to normal. Two of their conclusions deserve especial mention. "Insulin has tremendously improved diabetic treatment, but has not simplified it." Again, "Insulin . . . cannot atone for lax or inaccurate dietary methods."

A Defence of the Principle of Undernutrition.

In the first number of vol. iii. of the same journal J. W. Sherril continues the account of the work done in Allen's laboratory with a paper on the influence of carbohydrate and protein on diabetes and the insulin requirement. The diets of the patients were very carefully controlled and were changed in order to bring out special points. He concluded that carbohydrate had a stronger glycosuric effect, and required more insulin than any other kind of food when it was given in equal caloric value. Protein required much less insulin than carbohydrate when it was substituted for carbohydrate either in equal caloric equivalents or in equal carbohydrate content. It was also much less efficacious in the treatment of hypoglycæmia. Some of these results are rather surprising as it had been thought that the specific dynamic action of protein gave it special glycosuric properties. Sherril also concluded that there was no constant relation between insulin dosage and the carbohydrate intake, as it depended very largely on the caloric value of the diet. Allen discusses the influence of fat and total calories on diabetes and the insulin requirement. He opens with a long and able defence of the principle of undernutrition, and attacks the work of his critics, especially Woodyat, Newburgh, and Marsh. Numerous tables are given of diet experiments with insulin. An attempt was made to assess the total insulin requirements of a small girl of 3 years old. This child could only tolerate 100 calories without passing sugar, but with 3 units of insulin 400 calories were tolerated. It is suggested that her initial insulin production was about 1 unit and that she therefore needed 4 units altogether for that amount of food. The evil effects of a great increase in the body-weight due to a great increase in the caloric value are pointed out. In one case the dose of insulin was very large and had to be increased. When the diet was reduced the weight decreased and the dose of insulin could also be diminished. The effect of these facts is that the clinical condition is no longer a guide to the real condition of the patient being treated with insulin. Allen concludes that the principles on which the undernutrition treatment were built have been proved correct by his experiments with insulin. C. H. Best and D. A. Scott had been exploring the possible sources of insulin, and, stimulated in their search by the publication of Winter and Smith's work on the presence of an insulin-like substance in yeast, have been able to demonstrate a substance which lowers the blood-sugar of rabbits in potatoes, rice, wheat, beet-roots, and celery. Working with Banting they have also demonstrated an insulin-like substance in the blood of the ox, dog, rabbit, and man.

Results from Switzerland and Germany.

The *Schweizerische Medizinische Wochenschrift* dated August 30th contains two articles on insulin. Prof. H. Sahli, of Bern, gives a good account of the early work on the search for the internal secretion of the pancreas, paying special attention to that of Zülzer. The latter undoubtedly showed in 1907 that a pancreatic extract had considerable influence on the urine sugar of diabetic animals and patients, but the local symptoms following the injection were so unpleasant that the discovery attracted little attention, and was soon forgotten. Prof. Sahli proceeds to describe the physiological properties of insulin and its effects on patients with diabetes mellitus. He lays especial stress on the importance of combining the use of insulin with the usual dietetic treatment. He gives an account of the method which he has employed for mild and severe cases. If determination of the blood-sugar cannot be made, he thinks it is safer to allow the patient to excrete a little sugar, although he admits that this is not the ideal treatment. He also expresses the opinion that insulin is only a symptomatic treatment, and has no real healing process. But a vicious circle can be broken by its use, and in this sense it has a certain degree of curative value. Dr. M. Guggenheim, of Basel, also gives a good account of the past and present uses in discovering insulin, and of its physiological action and clinical effects. He considers that the amount of food and the dose of insulin should be so chosen that the fasting blood-sugar is within normal limits. A very large number of references is given.

In the *Deutsche Medizinische Wochenschrift*, of August 17th, Prof. W. Ercklentz gives an account of his treatment of six patients with insulin. The clinical results were very good. He also states that if blood-sugar determination cannot be made it is better to allow the patients to pass a little sugar. In the same journal (August 24th) Prof. O. Minkowski, who with von Mering was responsible for the original extirpation experiments on the pancreas, expresses his

[1] See a similar striking case, THE LANCET, 1923, i., 1277.

satisfaction with the properties of insulin. He gives an interesting account of the hindrance to the introduction of insulin into practice in Germany at the present time owing to the difficulties with the exchange and the bad financial conditions.

Standardisation of Insulin.

In "Public Health Reports" (August 3rd) Prof. Carl Voegtlin and Edith R. Dunn describe the difficulties of standardising insulin. They have used albino rats instead of rabbits, as being less expensive. The rats are kept on a constant diet. It was found necessary to keep the temperature of the chamber constant, as the rats were much more easily killed at a temperature of 28° to 30° C. than between 15° and 22° C.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH

THE following table gives some of the principal health statistics of a group of counties for 1922 :—

Name of county.	Estimated population.	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory with influenza.	Infant mortality		Maternal mort. from childbirth.
							Legit.	Illegit.	
Northampton-shire.. ..	213,340	18·1	11·7	0·9	1·4	1·8	58	77	5·2
Warwickshire..	348,003	21·2	11·0	0·8	1·0	2·2	(60)		5·0
Cambridgeshire	129,591	18·3	12·7	0·9	1·6	—	59	65	3·3
Cumberland ..	218,499	22·3	14·7	0·9	1·3	3·1	99	117	5·1
East Suffolk ..	207,424	19·5	12·6	1·1	—	—	(64)		—
West Suffolk ..	109,406	18·6	13·6	1·0	1·7	2·3	(55)		3·4
Fife	112,384 (extra-burghal)	22·4	12·6	0·8	1·1	2·5	(99)		6·0

The bracketed figures give the total infant mortality. Lines indicate that the information was not given in the report.

Northamptonshire.

Dr. Charles E. Paget reports that a special subcommittee of the county council is considering the coördination of health services but had not finished its deliberations at the end of the year. A move has been made in the direction of having a single small-pox hospital for some of the northern county districts. The Rushden House Sanatorium was opened in the fourth quarter of 1921 for early, middle, and advanced cases of pulmonary tuberculosis. The 50 beds retained for men, women, and children from the county remained full during 1922, but the 18 beds set aside for private patients and other authorities were not so utilised. Two of the latter were used for spinal cases, pending the provision for such cases at the Shropshire Orthopædic Hospital at Oswestry. Some progress has been made in the improvement of water-supplies, but the long delayed scheme for Thrapston is still only under consideration. Housing schemes have provided 530 new houses in 19 out of the 28 districts and private enterprise 90 new houses in 21 districts; but house shortage is acute in the Raunds, Rushden, Desborough, Irthlingborough, and Kettering urban districts and in the borough of Daventry. The veterinary inspection of cattle is proceeding satisfactorily in certain districts, and Dr. Paget hopes it will soon become general in the county. The public analyst reports that 19 of 335 milk samples were below the standard and 8 out of 17 samples of skimmed milk. In one milk 60 per cent. of the fat had been abstracted and in two cases 30 per cent. and 40 per cent. respectively of water had been added.

Dr. Lila S. Greig, in her maternity and child welfare report, shows that 51 per cent. of the births are attended by midwives. She points out the need that the doctor called in to a suspected septic case should give prompt instructions to the midwife. The midwives have been supplied with collosol argentum, but this practice is to be discontinued. It is not thought that the incidence or severity of ophthalmia neonatorum has been diminished by the use of collosol argentum and it has been used by midwives in some cases for treatment, causing a delay in notification. Out of 20 notifications, the sight of the left eye was lost in one case and in another the result is not known, these two cases being in doctors' practices. The other notified cases made a good recovery. Dr. Greig mentions that among the notifications required of the midwives that with regard to artificial feeding is the most neglected. Out of 74 infants reported by the midwives at the end of the year to be artificially fed, only 28 had been notified by them at the proper time. The percentage of breast feeding reached 73·7 per cent. in 1919 but has since declined and was 65·5 per cent. in 1922. Health visiting in the Brackley area is carried out by the Northamptonshire District Nursing Association. Up to September this work was supervised by Dr. Greig, but from that date till the end of the agreement the special subcommittee, mentioned at the outset, has arranged for the work to be supervised by the superintendent of nurses. A report will be furnished to the subcommittee at the end of the period covered by the agreement.

Warwickshire.

Dr. A. Hamilton Wood deals with the pollution of the Rivers Tame, Anker, and Avon. The Tame is already polluted by the Black Country towns before it reaches Warwickshire and steps are being taken to minimise this. Inside the county the Birmingham, Tame, and Rea Drainage Board are carrying out experiments and improvements. As regards the Anker, the Nuneaton Council has converted old contact beds into percolating filters to keep back the excess of suspended matter appearing in their effluent and propose to lay down additional circular filter beds. It is hoped, too, that a satisfactory method has been decided upon for dealing with the long existing nuisance from the trade waste of the Sketchley Dye Works. The Avon is chiefly polluted by Rugby and Coventry. Rugby needs an extension of its filters but their proposed scheme has been restricted by the Ministry. Coventry has been experimenting for two years with bio-aeration (the method worked out at Sheffield), and proposes to apply this method to a daily flow of 3 million gallons at present imperfectly treated by irrigation. The new scheme of the Ministry of Pensions for the vocational training of ex-Service men suffering from tuberculosis is mentioned and it is pointed out that there is apparently insufficient accommodation at the training centres. In Warwickshire 17 men were examined in the summer of 1922, and six were passed as clinically suitable. Of these six, four were still waiting for vacancies in January, 1923.

Dr. Wood complains of the incomplete notification of births and suggests that it may be partly due to deliveries being conducted by handywomen who are afraid to notify. Of 7373 births, 505 were not notified. The mortality from puerperal fever was the highest ever recorded in the county. Dr. Wood also refers to the large number of still-births and does not see much likelihood of improvement till the practice of midwifery is given a higher place. In view of the many problems worthy of careful study which confront the accoucheur and the fact that midwifery deals with the ante-natal, natal, and post-natal states, he thinks that midwifery should rank in importance with other specialised branches of medicine "and not be left in the haphazard hands of the rank and file of the profession." The excellent system of voluntary infant welfare centres run in coöperation with the county council's scheme continues to develop. There are now 29 centres throughout the county. Three

new centres were organised during the year, in spite of the fact that no grant from the Ministry is available for this extension; they are financed entirely by voluntary funds. The amount available for free milk has been made to go further by limiting the amount granted to each household (except in the case of bottle-fed twins) to one pint of fresh milk daily or three packets of dried milk fortnightly. Dr. Wood thinks notification of ophthalmia neonatorum should be made direct to the county medical officer of health, but he is in the happy position of recording that of 59 notified cases of this disease, all recovered with vision unimpaired.

Cambridgeshire.

Dr. Frank Robinson's report shows that much attention is given to the question of the midwifery and nursing service both in the county and borough of Cambridge. Through the agency of the County Nursing Association the number of trained midwives has increased since 1916 from 24 to 50. There are now only four untrained midwives. All the trained midwives practising in rural areas are also district nurses. During 1922 three grants were made to the County Nursing Association for the training of nurse-midwives who have to undertake to practice for three years in the county after becoming qualified. Through the County Association three new district nursing associations covering ten parishes were started during the year. Grants are also made by the county council towards the expenses of some of these district associations in employing nurse-midwives. Since the passing of the Midwives Act, 1918, the proportion of cases in which the midwives summon medical aid has gone up from 5·2 per cent. in 1919 to 7·2 and 7·1 per cent. respectively in 1921 and 1922. Of the 152 cases in which a doctor was called in during 1922, the county council paid the fee in 102 cases but, wherever possible, the fee is recovered from the patient in whole or in part. The borough has its own maternity and child welfare scheme, and under this scheme 139 expectant or nursing mothers received dental treatment, of whom 58 were provided with artificial dentures, one condition being that they agree to their children receiving dental treatment both up to 5 years of age and during the whole of their school life. Some progress has been made in housing matters, but Dr. Robinson estimates that some 600 or 700 new houses are still required in the county, apart from new houses needed to replace worn-out property. The severe drought of 1921 stimulated the provision of schemes of water-supply, and progress in this direction is reported.

Cumberland.

Dr. F. H. Morison is inclined to attribute the great increase in infant mortality to unemployment and the resulting inadequacy, especially as regards vitamins, of the diet of a large section of the community. The districts which showed the highest rates were those where there was most distress—viz., Cleaton Moor, 166; Whitehaven, 160; Workington, 127; and Egremont, 121. Dr. Morison returns to the food question in speaking of the prevention of tuberculosis, and expresses his belief that education of the community in food values would constitute one of the most valuable public health campaigns. He thinks we should do as is done in the case of quack medicines and proprietary articles—i.e., we should repeat our teaching until everyone is convinced that what is repeated so often must be true. He thinks the two most hopeful methods of dealing with tuberculosis are segregation of advanced cases and raising the resistance of those who are most susceptible, such as contacts, debilitated, and so-called pre-tuberculous children. He suggests that the Industrial School at Cockermouth, at present disused, might be used with the latter object as a preventorium for debilitated children. Returning to the subject of the high infant mortality rate, Dr. Morison points out that "at the present time there are no maternity and child welfare centres in the county with the exception of the one at Wigton, which is worked by the Wigton District Nursing Association."

The medical superintendent of the Englethwaite Industrial Colony for Consumptives, Dr. Mark S. Fraser, reports that of 79 men who received treatment and training and left during the last three years 23 are earning their living. Of the 23, 16 are in receipt of a modified pension and it is impossible to say if they would be able to maintain their families without this subsidy. Eleven of the 23 are working at trades learned at the colony. Dr. Fraser has seen most of them and finds that their health and working capacity are not nearly so good as those of the seven ex-colonists who are employed at Englethwaite. In consequence letters have been addressed to the sanitary authorities concerned asking them to establish after-care committees to befriend ex-colonists belonging to their own areas.

East Suffolk.

Dr. G. I. T. Stewart points out that for railway and other reasons the problem of locomotion is a difficult one in East Suffolk, and that the formation of combined districts with whole-time medical officers is not easy. Hospital accommodation is "lamentably deficient," and for this coöperation is the remedy. Dr. Stewart suggests a scheme for four areas based on an adequate motor ambulance service: (1) southern area—hospital at Ipswich and Felixstowe; (2) north-western area—hospital at Stowmarket (West Suffolk to be asked to join); (3) north-eastern area—hospital at Lowestoft; (4) central area—to be provided for by a county hospital at Saxmundham. The V.D. work is done at Ipswich and Norwich, but a clinic is needed at Lowestoft. The inspection of midwives is carried out by the superintendent of the Suffolk County Nursing Association. Lowestoft has its own child welfare scheme. Otherwise there is little to record in the way of "centre" work. There are three one-day-per-week centres at Aldeburgh, Beccles, and Stowmarket with average attendance of 6, 15, and 17 respectively, and centres started at Felixstowe, Leiston, and Wickham Market have closed down owing to lack of interest.

West Suffolk.

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CANCER AND DIET.

To the Editor of THE LANCET.

SIR,—Your leading article under the above title in THE LANCET for last week obviously necessitates a reply from me.

Needless to say, no one can regret more than I myself the "flamboyant" and unwarranted statements that appeared in a certain section of the public press in reference to my paper in the Physiological Section at the recent meeting of the British Association. And I specially regret that your criticism of my communication should have been based on unsatisfactory reports. Rationing in this country during the last year of the war was fairly stringent, in the large towns at any rate, this stringency having been specially marked as regards those foodstuffs which, as you state, provide the main part of the fat-soluble vitamin A in a normal dietary. And yet, except as regards tuberculosis, there is, so far as I am aware, little evidence that the public health was adversely affected; while, as indicated by the Registrar-General's statistics, the cancer mortality for both sexes, especially in London, was slightly though definitely diminished. In the case of the Central European States to which you allude additional factors came into operation.

My own investigation as to the results of a dietary deficient in the fat-soluble A factor but sufficient (and this is the important point) in every other respect, while at the same time varied and appetising in character, has now extended over a considerable period,[1] and has included an experience of it in my own person lasting for nearly a couple of years. During this time I was necessarily engaged in a certain amount of physical as well as mental work. Yet it was not until the end of that period that I experienced any noticeable ill-effect as the result of the experiment—a skin affection of the palms of both hands which readily cleared up on the addition to my dietary of uncooked vegetable food in the form of salads. And Dr. Wyard,[2] reporting on our investigation at the Cancer Hospital, which you quote, stated in reference to patients on this dietary that "In no case was any unfavourable change in the general condition of the patient attributable to the diet, and in many improvement was definite, at least at first." The medical superintendents of several infirmaries in which patients have also been under treatment have reported to the like effect. The suggestion that I have overlooked the literature of the subject, and, more particularly, the work of Prof. J. C. Drummond, is hardly borne out by the fact that in my paper I specifically referred to his investigations and, as regards the growth of tumours, stated that I was in general agreement with his views.

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As regards the final paragraph, I may perhaps be permitted to state that a few months ago I submitted to a meeting held in the laboratories of the Imperial Cancer Research Fund, under the chairmanship of Dr. Murray the Director, a communication practically identical in terms with my Liverpool address. This meeting, at which Dr. Wyard was also present, afforded opportunity for helpful criticism. The dietary in question has been gradually evolved as the outcome of consultations with Prof. Gowland Hopkins and other bio-chemists; of experiments on myself, and, with their consent, on other private individuals, and of patients in various public institutions; as also of a comparative study (not yet completed) of the dietaries and vital statistics of certain "enclosed" and "unenclosed" religious communities in this country and abroad.

It is, I think, unnecessary to comment on the assumption with which the article concludes.

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PROBABILITY AND EXTRASENSORIAL CHANNELS OF KNOWLEDGE.

To the Editor of THE LANCET.

SIR,—In his address on Extrasensorial Channels of Knowledge (THE LANCET, Sept. 8th), Prof. Charles Richet brings forward evidence which, in his opinion, establishes the truth of "knowledge of reality obtained by other means than by the ordinary channels of the senses." Some of this evidence is of the following character. A dreams that B, of whose movements he can have no direct means of information, has died, and, in fact, B *has* died. To the retort of the man in the street that this is a mere coincidence, Prof. Richet replies: "Chance is, indeed, a very convenient god, to which we can always appeal. But why should we introduce these extremely small probabilities into our calculations? Practically we never come across a probability of 1 to a 100 million, and yet this is the figure at which one must assess the probability of Wingfield having once in the course of his life a single hallucination, and that just the hallucination of his brother being killed at the same moment. Chance will evidently not explain these occurrences." I do not know how it is possible to assess the arithmetical value of the probability in Wingfield's case, since I have no knowledge of the frequency or contents of this gentleman's dreams, save in one instance, but the man in the street would surely rejoin that, far from never coming across probabilities of 1 in 100 millions, he meets them almost every evening. The probability that the dealer at bridge will distribute the 52 cards in any assigned order is measured by a fraction which has more than 60 zeros after the decimal point before we reach a significant figure, it is the reciprocal of the continued product of $52 \times 51 \times 50$, &c. Events, the probability of which is so immensely less than Prof. Richet's 1 in 100 millions, happen regularly wherever four bridge players are gathered together. Evidently there is something wrong. The philosophy of the

new centres were organised during the year, in spite of the fact that no grant from the Ministry is available for this extension; they are financed entirely by voluntary funds. The amount available for free milk has been made to go further by limiting the amount granted to each household (except in the case of bottle-fed twins) to one pint of fresh milk daily or three packets of dried milk fortnightly. Dr. Wood thinks notification of ophthalmia neonatorum should be made direct to the county medical officer of health, but he is in the happy position of recording that of 59 notified cases of this disease, all recovered with vision unimpaired.

Cambridgeshire.

Dr. Frank Robinson's report shows that much attention is given to the question of the midwifery and nursing service both in the county and borough of Cambridge. Through the agency of the County Nursing Association the number of trained midwives has increased since 1916 from 24 to 50. There are now only four untrained midwives. All the trained midwives practising in rural areas are also district nurses. During 1922 three grants were made to the County Nursing Association for the training of nurse-midwives who have to undertake to practice for three years in the county after becoming qualified. Through the County Association three new district nursing associations covering ten parishes were started during the year. Grants are also made by the county council towards the expenses of some of these district associations in employing nurse-midwives. Since the passing of the Midwives Act, 1918, the proportion of cases in which the midwives summon medical aid has gone up from 5·2 per cent. in 1919 to 7·2 and 7·1 per cent. respectively in 1921 and 1922. Of the 152 cases in which a doctor was called in during 1922, the county council paid the fee in 102 cases but, wherever possible, the fee is recovered from the patient in whole or in part. The borough has its own maternity and child welfare scheme, and under this scheme 139 expectant or nursing mothers received dental treatment, of whom 58 were provided with artificial dentures, one condition being that they agree to their children receiving dental treatment both up to 5 years of age and during the whole of their school life. Some progress has been made in housing matters, but Dr. Robinson estimates that some 600 or 700 new houses are still required in the county, apart from new houses needed to replace worn-out property. The severe drought of 1921 stimulated the provision of schemes of water-supply, and progress in this direction is reported.

Cumberland.

Dr. F. H. Morison is inclined to attribute the great increase in infant mortality to unemployment and the resulting inadequacy, especially as regards vitamins, of the diet of a large section of the community. The districts which showed the highest rates were those where there was most distress—viz., Cleaton Moor, 166; Whitehaven, 160; Workington, 127; and Egremont, 121. Dr. Morison returns to the food question in speaking of the prevention of tuberculosis, and expresses his belief that education of the community in food values would constitute one of the most valuable public health campaigns. He thinks we should do as is done in the case of quack medicines and proprietary articles—i.e., we should repeat our teaching until everyone is convinced that what is repeated so often must be true. He thinks the two most hopeful methods of dealing with tuberculosis are segregation of advanced cases and raising the resistance of those who are most susceptible, such as contacts, debilitated, and so-called pre-tuberculous children. He suggests that the Industrial School at Cockermouth, at present disused, might be used with the latter object as a preventorium for debilitated children. Returning to the subject of the high infant mortality rate, Dr. Morison points out that "at the present time there are no maternity and child welfare centres in the county with the exception of the one at Wigton, which is worked by the Wigton District Nursing Association."

The medical superintendent of the Englethwaite Industrial Colony for Consumptives, Dr. Mark S. Fraser, reports that of 79 men who received treatment and training and left during the last three years 23 are earning their living. Of the 23, 16 are in receipt of a modified pension and it is impossible to say if they would be able to maintain their families without this subsidy. Eleven of the 23 are working at trades learned at the colony. Dr. Fraser has seen most of them and finds that their health and working capacity are not nearly so good as those of the seven ex-colonists who are employed at Englethwaite. In consequence letters have been addressed to the sanitary authorities concerned asking them to establish after-care committees to befriend ex-colonists belonging to their own areas.

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calculus of probabilities has engaged the attention of many eminent men and they have made such sad mistakes, according to Mr. J. M. Keynes, that it is dangerous for a mere statistician to suggest an explanation; but, as the use of probabilities is very common in medical inquiries and so distinguished a physiologist as Prof. Richet has employed that calculus, it may be of interest to play the devil's advocate and to argue that Prof. Richet's treatment of his problem is wholly fallacious.

The point I submit is, that in any rational application of the calculus of probabilities there is always expressed or implied an alternative. Thus suppose four persons sit down to play bridge and the dealer receives the whole of a particular suit. The chance that this will happen is much less than one in a billion, a good deal smaller than one in 100 millions. Suppose the four players are intimate friends, they may be surprised, they may even write to the *Field*, but they will not suspect the dealer of cheating. But suppose that the four players are total strangers come together in the smoking room of a transatlantic liner, the opponents of the dealer who has dealt himself or partner 13 of a suit might do more than write to the *Field*. The point is that the alternatives in the two cases are not deemed to be equally probable. The probability that an intimate friend has cheated at cards is deemed to be very much less than 1 in a billion, but the probability that a total stranger has cheated is thought greater than that a particular event of this order of frequency *and favourable to him* has happened.

Consider the method of application of the calculus of probabilities to medical problems, usually regarded as legitimate. A persons have been attacked by a disease and treated with a particular remedy and a have recovered, B persons similarly attacked have not been treated and b have recovered. The fraction a/A is greater than the fraction b/B; is the difference significant? Let us suppose, which is *not* always true, that A and B are, apart from the giving or withholding the remedy, absolutely *in pari materia*, and that the probability that such a difference as $a/A - b/B$ might arise "by chance" can be arithmetically computed—which again is not always true—and that we find this chance to be 1 in a billion, what is the inference? The inference depends upon the nature of the alternative. If the remedy is such that its *possible* activity is not incongruent with the whole of our knowledge, we shall infer that it is more likely that the remedy had an effect than that an event which on the average happens once in a billion trials has happened this time. Suppose the disease were acute intestinal obstruction and the remedy painting the left wrist with iodine; we should refuse to believe that the cases were *in pari materia* or we should adopt the attitude of the friendly bridge players. Suppose the disease were diphtheria and the remedy antitoxin, we should unhestiatingly accept the alternative. Between those extreme terms lies a continuous series of instances; the mere statement of a probability is not and never can be sufficient of itself, it is only great or small in relation to something else. That is, of course, the argument of Hume—stated before his time by Locke, who said, "It is harder to believe that God should alter or put out of its ordinary course some phenomenon of the great world for once, and make things act contrary to their ordinary rule purposely, that the mind of man might do so always after, than that this is some fallacy or natural effect of which he knows not the cause, let it look ever so strange."

I need not use space to point out the application of these considerations to Prof. Richet's thesis, but those who are interested in the particular class of investigations to which he refers will find a very instructive discussion of the application to them of the calculus of probability in Prof. Edgeworth's notice [1] of Prof. John Coover's investigations.

I am, Sir, yours faithfully,

MAJOR GREENWOOD.

National Institute for Medical Research,
Hampstead, N.W.3, Sept. 21st, 1923.

[1] Jour. Roy. Stat. Soc., lxxxii., 1919, 222.

A PLEA FOR THE NATIONALISATION OF OUR MENTAL HOSPITALS.

To the Editor of THE LANCET.

SIR,—It is not until quite recently that the attention of the medical profession, and to a certain extent of the general public, has been at all directed to the position of the treatment of disorders of the mind. Probably owing to their extreme complexity it has remained more or less in the background. No attempt has been made on anything but the smallest scale to apply the same methods of investigation and treatment which mark other branches of medical science. As a result the insane have been merely herded together in public institutions really more concerned with the safeguarding of the public than with alleviating the sufferer. Reform on these lines has merely meant a more humane segregation, with the result that scattered all over the country we find these large buildings, for the most part admirably and economically administered, where the insane are housed and fed while they may or may not recover. What position these institutions hold in the opinion of the outside public is clearly shown by the fact that practically all admissions to them are involuntary. Nowhere is there yet set up a system where the early sufferer will come for advice and treatment in the same way that he will flock to the ordinary out-patient department of any of our large hospitals.

But at last the mystery attached to the label "mental" is gradually being solved and removed. It is recognised that for the best results cases must be seen in their incidence. Also that disorder of the mind requires not only the specialist trained in psychological methods, but the help of the pathologist and the physician, in fact of every branch of the profession. And not only this, but equally important is skilled nursing of the very highest order. With what result? That the treatment and study of mental diseases is passing to the place where only these advantages can be reaped—into relation with our general hospitals and teaching centres. For if, say, a case of cardiac disorder or a fracture turns out badly, the patient can still carry on under a partial disablement; but let a disorder of the mind become chronic and it results in a complete failure and a permanent loss to the State. It is quite impossible and also unnecessary to alter our present asylums and make them into hospitals suitable for the reception and treatment of acute mental disorders; and equally impossible for the large bulk of their present medical staffs to keep themselves abreast of modern methods. And neither is this the most economical method. It is waste of time, money, and personnel to employ a highly trained staff on the nursing of idiots, dements, and the hopelessly insane. Having regard for the treatment they require, we can divide our patients roughly into two classes: in the early stages, when everything that our science can possibly do for our patient must be tried; if this fails in its end and no recovery takes place, we pass to the second, the chronic or hopelessly insane, requiring merely some institution where they can be looked after as economically as possible with due regard to their happiness, comfort, and welfare, and where they can be employed to the best advantage with regard to their cost of maintenance and by this means made the least possible burden to the State.

Now arises the problem, how can early mental disease be brought into contact with the conditions it requires for its treatment? It is impossible to think that under present conditions this will ever maintain in the majority of our county or borough asylums. Their isolated position alone is almost a bar to most of them. Neither ought the matter to remain in statu quo until the country can stand the enormous expense of building and equipping new and modern mental wards. In the meantime there is one obvious way in which the best can be done for the sufferer. It is out of the question that every case of mental disorder can be sent for treatment to one or other of

our great teaching centres. But why not bring a recent product of this centre to him? A constant supply of skilled physicians, au fait with every advance in the diagnosis and treatment of mental diseases, must be supplied to all our county and borough asylums. Not to one or two of them, but to every one in which early acute cases are admitted. Present buildings cannot be altered, neither can their inaccessibility; but at least they can be supplied with a staff of the highest efficiency, who will do their best in the conditions under which they have to work to apply for the benefit of those under their care the methods of investigation and treatment emanating from our hospitals and universities. And this can only be brought about by nationalising the whole asylum service and bringing it under one central control.

Let us consider such a service a little in detail. It should most certainly come under the Ministry of Health, and the nucleus of its special control, or "G.H.Q. asylums," already exists in the present members of the Board of Control. At present this Board has no control, or practically none, except perhaps from a legal point of view. But under a national scheme it would own completely all asylums at present designated "pauper." It could introduce what reforms it wished, appoint the various resident staffs, and its visiting consultants could take with them into town and country a knowledge of the most recent methods of investigation and treatment, to place at the disposal of the resident staffs. For who has not served as house surgeon or later as divisional officer and does not appreciate how such visits keep a man up to the scratch? And how much better employed would skilled physicians be going over our recent admissions with us, teaching us and advising our actual treatment, than writing reports recommending a more general use of toothbrushes in such and such institution, or saying how nice the patients' dresses looked. In the same way there would exist at the Board of Control a department corresponding to that of the Quartermaster-General. These gentlemen would standardise everything in use, from dress material to medical stores, and would distribute them as in the army from a central depot or depots. Some commodities it would conceivably be cheaper to purchase locally. They would appoint the officers, and visit, inspect, and control the departments at present known as "stores," "farm," "clerk of works," "accounts," and even the padre. Corresponding members of asylum staffs would constitute a "service" just as would the medical side, and would reap the same benefits.

There would be an entrance examination, standardised pay, promotion, and pension. Examinations qualifying for promotion to a higher grade in the service would have to be passed before any step upwards, and most important, "movement orders" would be issued by the Board of Control. In this way all medical officers would periodically and regularly pass through one or other of our teaching centres as a part of their duty; there would be none of the present farcical method of appointment, and no one would be left out in the cold to rusticate and become a typical "chronic" to his own detriment and that of the patients under his care. Anyone failing to qualify for promotion would not be kept in the service but the right men would get to the top. It is the staffing of hospitals where actual treatment of recent cases is being undertaken which calls for the highest efficiency. To these would be supplied the young, active, progressive, and best qualified members of the service. Senior members would eventually be automatically moved either to fill purely administrative posts, or to the essentially chronic buildings where wise and economic administration is the main asset; and where their experience and foresight can be used to the best advantage of the service as a whole. The nursing service would be similarly constituted. Each institution would have a definite establishment, promotion to positions corresponding to N.C.O.'s would all have to go through G.H.Q. before being confirmed, recruiting locally for the junior posts, or "privates" if necessary.

The entire cost would be taken off the shoulders of local authorities and would become a common universal Government tax. The total expenditure of all our county and borough asylums for the year 1921 was under 8 million pounds, about the cost of one modern battleship, very little to pay when the importance of the question is realised. For the Government to take over its mental hospitals means no new expense, but merely a transference from a local rate to a national tax. A single control is absolutely necessary to prevent overlapping and to ensure economy and efficiency. Present institutions can then at once be used to the best advantage of the service, and not as at present, merely for local requirements. Some would be used solely for the chronically insane, on whom it is a waste of money and personnel to employ a highly skilled staff. Empty beds in these institutions can always be filled by segregating patients with no friends. Others could be specialised into convalescing hospitals, where patients on the way to recovery can be sent to reap the benefit of outdoor occupation; this in turn easing the demand for accommodation in the acute blocks. Of two more or less adjacent buildings, the one more easily adaptable and more accessible for a visiting staff could be used as the acute building for the reception of new cases, the other becoming essentially chronic in character and therefore needing no modernising and no highly skilled staff. It would seem that by wise administration the general lunacy tax should be appreciably less than the present average county or borough maintenance rate.

The patient, and a medical staff with the necessary training and skill, are brought into contact near to the former's home and friends. Beds for the early treatment of cases can be subsidised by the Government in some of our large general hospitals, out-patient departments set up and the best advice brought within the reach of all. Not only the patients' treatment, but their food, clothing, occupations, and amusements would be uniform and the best available. The present farcical investment of a lay committee with practically the sole right of discharge would depart into the waste paper basket. This power would be invested in the medical superintendent, at whose disposal in difficult cases would be the advice of the whole of the consulting staff of the service. A patient could receive his discharge as soon as fit and not have to wait for monthly meetings. And so it comes about that the very best of advice and treatment is placed at the disposal of the poorest; a state of affairs which maintains also in every other branch of our profession.

It would be up to each private mental hospital for the reception and treatment of acute mental disorders to put its house in order; the entire cost of which, of course, they themselves would have to shoulder. There could exist no possible bar to the present practice persisting of private patients being received into Government institutions. Provided, of course, that such buildings were deemed by the Board of Control as suitable for the class of case received, and that the charges, depending on the advantages and conditions offered, were privately borne. This paper is written in no attitude of criticism, nor does it pretend to have solved more than a very few of the difficulties, but rather in a spirit of hope that this important matter may soon be taken up. There is no money available in the country for expensive new buildings. Meanwhile, the problem is to make the best out of what we have actually got. How to tackle the task, so that as speedily as possible, an efficient service can be brought about with as little waste and as little disturbance as is absolutely necessary. At present, for obvious reasons, Smith who goes insane in "Blanktown" may receive every advantage and chance of recovery for 20*s.* a week; whereas Brown, because he happens to be domiciled in "Muddleshire," starts with a 30 per cent. disadvantage at perhaps half a crown a week cheaper. The brains of a country are its most important

asset and should be the first charge on its estate. The present standard of the treatment of the insane as a whole is many years out of date. To bring that standard on to a level with that reached in any other of the ills that flesh is heir to, is a national affair, a matter of vital importance to future generations and to the race as a whole. It is surely up to the nation to take the matter in hand and to shoulder its responsibility, for private enterprise must inevitably fail. There must be some central controlling and guiding authority. Run something on these lines it would make a most attractive service. Not only will it attract good men into its own special branch, but it can utilise and bring the best brains in all branches of the profession as a whole, to bear on to the most difficult and abstruse of all medical problems. Difficulties there will be, but they can all be got over, and fortunate will be those privileged to assist in working out the scheme and to see it actually working. For come it will.

I am, Sir, yours faithfully,

A. T. W. FORRESTER, M.D. Lond.

Leicestershire and Rutland Mental Hospital,
Narborough, Sept. 18th, 1923.

INJURY AND DISEASES OF THE ARTICULATIONS.

To the Editor of THE LANCET.

SIR,—Mr. Timbrell Fisher is greatly to be congratulated on his research work in that very difficult field of physiology, the articulations, of which he gave a brief résumé in your issue of Sept. 15th. In discussing treatment, Mr. Fisher suggests that in many sufferers from arthritic disease of non-tubercular origin the infection has come to an end and that the whole of the symptoms are caused by the deformity, and he further implies that in this stage of the disease manipulative and presumably operative methods can be undertaken with a certain degree of safety, provided that too much force is not used in manipulating the affected joints. Mr. Fisher goes on to say that forcible manipulation is not advisable in the more acute forms, as it may give rise to a reaction after which the joint stiffens once more.

I would like to make it axiomatic in dealing with these conditions that until the disease is extinct—that is to say, until the infection is eradicated and there is no longer any risk of auto-inoculation—nothing forcible of any kind whatever must be done. I would add that manipulation may do a great deal of harm, because it may result in the spread of the disease into other parts of the body hitherto unaffected. The converse of this axiom is also true; once the infection is eradicated, any measures, manipulative or operative, can be undertaken with perfect safety. I base these conclusions on some 15 or 16 occasions when operative or manipulative measures were undertaken. Of these all have been successful except four. One of the four was a patient who, unfortunately, died from alcoholic delirium a few days after the operation. I have no reason to suppose that it would not have been successful. In the case of the other three, the operations were undertaken before the disease was eradicated, and the result was that some extension of the disease took place, and there was a long period of convalescence before anything further of this nature could be done. In one case three years, in another case six months, and in the third case not at all.

But it may be asked by what signs we may know that the infection is eradicated. This is a question of the greatest importance on which one would like to hear Mr. Fisher's views. All the patients in my care have undergone a course of vaccine treatment, and the antigens in every case have been streptococci, either stock or autogenous or both, and in the majority of cases *M. deformans*. My experience shows that as long as the patient is sensitive to small doses of these vaccines, it is neither safe to manipulate nor operate. But as soon as the patient can take large doses without any reaction, both are absolutely safe. Thus the three cases above-mentioned in which manipulation or operation failed were still sensitive to quite small doses—e.g., half to one million—whereas the whole of the successful cases took large doses, more than 20 million without reaction.

The criterion I would suggest then is the absence of response to a large dose of an appropriate vaccine. When, however, we consider the question of what that dose should be, some difficulty arises. It appears that vaccines prepared in different laboratories differ materially. I am quite ready to make a definite statement in regard to the correct "safety" dose of the vaccines I use, made in my own laboratory, and would put it at 20 million combined stock streptococci and *M. deformans*. But then my initial dose is one-tenth of a million, either of streptococci or *M. deformans*, and even this frequently cannot be tolerated previous to a course of desensitising peptone; whereas doses of streptococcal vaccine recommended by clinical laboratories and given by other men are usually far larger. Compare this initial dose with that of five million advocated by Dr. W. H. Wynne, for example, in your issue of Sept. 22nd. The reason of the discrepancy I do not know, unless it lies in the fact that 45 perfectly different varieties of streptococci comprise this stock vaccine and all were freshly isolated.

I am, Sir, yours faithfully,

Harrogate, Sept. 22nd, 1923. H. WARREN CROWE.

THE CAUSATION AND TREATMENT OF PRURITUS ANI.

To the Editor of THE LANCET.

SIR,—Pruritus ani is very common, and its causation appears to be wrapped in obscurity; its treatment, therefore, is naturally unsatisfactory. As Dr. E. F. Hoyt of New York has said, "the meagre literature upon this subject hobbles upon the crutches of hypothetical inferences which suggest a panoramic array of medical agencies, all unsatisfactory, and thereby confessing to a sad condition of helpless empiricism." Having been a sufferer from this complaint off and on for 34 years, it has occurred to me that my personal experience with regard to its treatment may be of value to those who have cases of this sort. I found that relief could always be obtained by getting out of bed as soon as one was roused by the itching, and after evacuation of the irritating mucus by straining, by free washing of the everted mucous membrane with cold water. This usually produced a quiet condition for the rest of the night. Then I found a collapsible tube of carbolic vaseline about ℥ ix. to 1 oz. of use; a little applied to the anus and into the bowel immediately before going to bed enabled me to get to sleep without the onset of the itching which otherwise seemed invariably to occur as soon as I tried to compose myself to sleep. For years I slept with a tube of this vaseline by my bed, and if I woke in the night I always applied a little of the ointment and so repressed the inclination to scratch.

About 24 years ago I consulted Sir Charles (then Mr.) Gordon-Watson. He held the view that the cause of this trouble lies in the papillæ of Morgagni, which, situated at the anorectal junction, are absent in the majority, yet present in a considerable proportion of individuals. They are normally small white glistening papillæ, pyramidal or triangular, with the apices directed upwards and inwards towards the lumen of the gut. They vary from one to six, and when hypertrophied resemble in size and shape the writing end of an ordinary lead pencil; when much hypertrophied they may be felt as small shotty nodules. In some cases one finds small fibrous branched papillæ as well; and I think it is advisable to destroy these also as they may possibly be an additional source of irritation. Dr. Campbell Margarey wrote a paper on this subject several years ago

in the *British Medical Journal*, from which I quote freely. He examined 50 out-patients with the speculum and as far as possible in consecutive order. In this series papillæ were present in 19 cases, or 38 per cent. The average age was 39 and of those in which papillæ were found was 38 years. The number of papillæ varied from one to six, with an average of two. In a series of patients suffering from pruritus ani attending the out-patient department from June to November, 1910, hypertrophied papillæ were present in 13, or 25 per cent. The papillæ were cauterised more or less thoroughly in all these cases, and in only one was there a lack of improvement. The majority made two subsequent attendances, reporting great relief, and then ceased to attend. This would serve to show that the cure of this exasperating complaint had been effected. In my own case Sir Charles Gordon-Watson destroyed these hypertrophied papillæ with the electric cautery. This was done without even a local analgesic and was not very painful. The itching, which had become unbearable, disappeared at once like magic, and I remained absolutely free for about five years. There was then a slight return occasionally, but carbolic vaseline kept it in check. About a year ago, as the pruritus had again become rather troublesome, I was examined by a surgeon, having first told him what he would probably find. He destroyed five or six papillæ with instantaneous results, and has since treated four similar cases with equally good effects. The reappearance of a papilla is in my case always attended by a return of the pruritus and discharge of irritating mucus which rapidly causes the skin to inflame.

It is possible for the patient accurately to locate by his own sensations the position of the papilla—e.g., at 6–9–10 o'clock—and in this way he can guide the operator as to where to look for it. If the skin be excessively sensitive and the sphincters very irritable, a little ½ per cent. novocain solution may be injected into the sphincters so as to cause their paralysis and allow of free exposure of the affected area. In one of our cases spinal analgesia was resorted to on account of the extreme excoriation and sensibility of the parts. The patient should be warned that the papillæ are likely to recur, and advised to return for their destruction immediately any fresh itching is felt.

I am, Sir, yours faithfully,

F. J. W. PORTER,
Major, R.A.M.C. (retd.)

Bombay.

THE MILNE TREATMENT OF SCARLET FEVER.

To the Editor of THE LANCET.

SIR,—The article by Dr. G. Gushue-Taylor in your issue of Sept. 8th on the Treatment of Scarlet Fever by Eucalyptus Oil and Carbolic Oil versus Isolation is a convincing demonstration of the futility of the treatment which has become associated with the name of its originator. What can be said of a method which, in the hands of the late Dr. Milne himself, produced a "return" case-rate of 46 per cent.? What would be said of any isolation hospital which produced any such a percentage of "return" cases of scarlet fever? The figures show that in 1904–5 cases treated by Dr. Milne by isolation gave a return case-rate of 1·2 per cent.

In 1918 cases treated by Dr. Milne by the Milne method—return case-rate 46 per cent.

In 1921 cases treated by Dr. Gushue-Taylor by the Milne method—return case-rate 28·2 per cent.

In 1922 cases treated by Dr. Gushue-Taylor by isolation—return case-rate 3·7 per cent.

There are two criticisms of the so-called Milne treatment. 1. It is prima facie unscientific. One could not expect any satisfactory sterilisation of the pharynx to be effected by the methods proposed. Further, scarlet fever is not spread by the skin, therefore the treatment with eucalyptus oil is a redundancy. 2. It has now been proved by an investigation lasting over 18 years that in practice it does not work. It is desirable to call attention to the article as some medical officers in search of a cheaper and more satisfactory method of dealing with scarlet fever than hospital isolation have sought to find it in the Milne method. Many cases of scarlet fever can be nursed at home, but the Milne treatment is of no assistance in preventing the dissemination of the disease or in lessening its complications.

I am, Sir, yours faithfully,

A. H. G. BURTON,
Medical Officer of Health, Ilford.

Sept. 18th, 1923.

Obituary.

MARGARET BOILEAU, M.B., B.S. LOND.

THE death of Dr. Margaret Boileau on Sept. 17th at Norwich removes an interesting personality from the ranks of medical women. Born in 1867, Dr. Boileau qualified M.B., B.S. Lond. in 1906 from the London (R.F.H.) School of Medicine for Women, having taken up the study of medicine preparatory to devoting herself to social and religious work. After working as clinical assistant to out-patients at the Elizabeth Garrett Anderson Hospital she started a general practice in Hammersmith, but for family reasons she was obliged to give up her medical work and return to her home at Ketteringham, in Norfolk. Here she engaged in social and medical activities, giving lectures on physiology to missions, lectures on venereal diseases, first-aid and Red Cross lectures, and assisting at an infant welfare clinic at Norwich. During the war Dr. Boileau became commandant of the Swainsthorpe Auxiliary to the Norfolk and Norwich Hospital and her work was specially commended. She was also Commissioner of Girl Guides for South Norfolk, and was elected as lay representative on the House of Laity, being one of the first women to hold this position.

Dr. Boileau will be much missed in Norfolk. Having an unusual faculty for explaining scientific truths in a clear and simple manner, her talks on hygiene and kindred subjects were much appreciated. Dr. Boileau had a good memory for detail, having travelled widely and read much. She had for every occasion an apt quotation, an appropriate illustration, or an amusing anecdote. She had a great gift for friendship and her loss will be deeply felt by a large circle of friends, people of many different classes and kinds.

THE LATE MR. H. D. FARNELL, F.R.C.S., O.B.E., J.P.

WE published last week a brief obituary notice of Mr. Henry Dawson Farnell. Since then we have received the following appreciations. The first, from Dr. A. Craigmile, is as follows: "Henry Dawson Farnell and I first met in the summer of 1875 at the Northern Hospital, Liverpool (now the David Lewis Northern Hospital), to which he came as senior house surgeon, and I as house physician; and so began a friendship which lasted without a break till now. Farnell had come straight from University College Hospital, where he had been under the influence of Marcus Beck—one of the junior staff. This young surgeon, shaking off the traditions of the London School, was struck by the reports of Lister's new antiseptic surgery, and had gone to Scotland to study under Lister himself. He returned full of enthusiasm for the new method, and so Farnell, inspired by Beck, with the sanction of his staff, introduced it to the Northern, and we were soon in the full swing of all Lister's ritual, as it then existed. Presently a marked change took place in the wards: suppuration disappeared, compound fractures healed kindly, and septicæmia and pyæmia were known no more, and so Farnell had the great honour of first introducing antiseptic surgery and Lister's methods to Liverpool.

The late Mr. Chauncy Puzey—one of our honorary surgeons—in his presidential address to the Liverpool Medical Institution many years after, paid a generous tribute to the work Farnell had done in this direction. Of his work in Eastbourne it is the province of others to speak. From the beginning we were drawn to one another by mutual tastes in many things, especially in literature and politics. He was a great admirer of Sir Walter Scott, and on holidays, spent together, he used to quote favourite passages and pithy sayings from his favourite novels, citing one incident after another. All who knew him well were aware of the interest he took in motoring to new places, where an old church with famous monuments and brasses and piscinæ was sure to claim his rapt attention, for he took the keenest pleasure in the history of his country and its old traditions, and knew nearly every cathedral well. He was 'the dearest friend and most unwearied spirit in doing courtesies'—ever loyal and unselfish and true to his principles wherever they might lead him."

Another colleague writes: "Farnell was not only a great surgeon, but a man to be trusted implicitly. His patients loved him for his tender care and unselfish devotion. In the prime of his life Farnell was a very type of mental and bodily vigour, and his energy was almost incredible. Even in the last months, when a certain failure of health necessitated some slacking off of labour, he stuck to such work as was possible; on the very day of the seizure, which was to prove fatal in so short a time, he took his seat on the Bench—he had been a justice of the peace for nearly 20 years—and the first symptom of his illness occurred when he was parting from a patient. He thus died as he himself would have wished, 'in harness,' and has left a void in the profession which will indeed be hard to fill."

The Services.

CHANGES IN THE DIRECTORSHIP OF THE MEDICAL SERVICES.

In July last Sir William B. Leishman took over from Sir John Goodwin the appointment of Director-General, A.M.S., resigning the Directorship of Pathology, in which he is succeeded by Colonel D. Harvey, while Major A. G. Rolleston is appointed Deputy Assistant-Director. On Oct. 1st Rear-Admiral Joseph Chambers will succeed Surgeon Vice-Admiral Sir Robert Hill as Director-General of the Medical Department of the Royal Navy. In the Indian Medical Service, as we announced on August 4th, Colonel Charles Harford Bowle-Evans became Director-General of Medical Services in place of Lieut.-General Sir C. H. Burtchaell, this being the first time that an officer of the I.M.S. has been appointed to be Director-General of Medical Services. At the same time the retirement of the Director-General, I.M.S., Sir William Rice Edwards, was announced; he has been appointed representative of the Government of India on the Permanent Committee of the International Bureau of Public Health. This latter appointment was held by Major-General Sir Richard Havelock Charles, who has vacated office as president of the India Office Medical Board and medical adviser to the Secretary of State in Council, Major-General J. B. Smith taking his place.

ROYAL ARMY MEDICAL CORPS.

Capt. P. Carney retires, receiving a gratuity, and is granted the rank of Maj.

The undermentioned temp. Capts. relinquish their commns. and retain the rank of Capt.: A. St. J. Bateman, E. B. Jones, E. H. Milson, and M. Shipsey.

ARMY DENTAL CORPS.

Capt. R. W. Shortreed, late Spec. List, to be Capt.

RESERVE OF OFFICERS.

Lt.-Col. St. J. B. Killery having attained the age limit of liability to recall ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Capt. W. F. Denning (late 4th Bn., Duke of Wellington's Regt.) to be Major.

TERRITORIAL ARMY RESERVE.

The undermentioned officers having attained the age limit are retired and retain their rank: Lt.-Cols. A. L. Jones and W. McG. Young (with permission to wear the prescribed uniforms); Maj. W. T. Blackledge (with permission to wear the prescribed uniform); and Capt. W. J. C. B. Pitt.

The undermentioned relinquish their commns. and retain their rank: Capts. S. Sharples and W. Boyd; Lts. A. L. Bastable and J. C. Jefferson.

Capt. F. D. Marsh, from General List, to be Maj.

General Hospitals: Lt.-Col. G. S. A. Ranking, having attained the age limit, is retd. and retains the rank of Lt.-Col.

INDIAN MEDICAL SERVICE.

Capts. R. H. Candy, Jamasji Cursetji Bharucha, H. Hingston, F. J. Anderson, and E. V. Morrison to be Majs.

ROYAL AIR FORCE.

Flight Lt. J. Paxton relinquishes his temporary commission on ceasing to be employed.

DEATHS IN THE SERVICES.

Surgeon-Captain Edward O'Malley, R.N., who died at Haslar Hospital on Sept. 20th, aged 51, was the son of the late Deputy Inspector-General O'Malley, R.N., and received his first commission in 1897. He saw service in the *Dido* during the Boxer rising, and was with the *Porpoise* in the Somaliland campaign. He served afloat with various ships of the Fleet during the Great War, and was only invalided out of the Navy 12 months ago. He leaves a widow but no children.

Medical News.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Post-graduate courses in various specialties will be given during October in London. Beginning on Monday, Oct. 1st, there will be a course on urology at St. Peter's Hospital for Stone. Demonstrations will be given in the out-patient department every afternoon, and in addition lecture-demonstrations by members of the staff, at 2 P.M., four times a week. A course of eight lectures on the more important diseases of tropical countries will be given by Dr. Low and Dr. P. Manson-Bahr at the London School of Tropical Medicine, beginning on Tuesday, Oct. 2nd. A course in laryngology, rhinology, and otology will be given at the Central London Throat, Nose, and Ear Hospital from Oct. 8th to 26th; clinical lectures and demonstrations will be given by members of the staff each day from 9.30 to 5 P.M. A course on children's diseases will be given at the Victoria Hospital for Children from Oct. 8th to Nov. 3rd, and special clinical instruction in ophthalmology will be available at the Royal London Ophthalmic Hospital during the whole of the month. From Oct. 15th to 27th short intensive courses in cardiology and proctology will be given at the National Hospital for Diseases of the Heart and St. Mark's Hospital respectively. A short course in dermatology will also be held at the Hospital for Diseases of the Skin, Blackfriars, from Oct. 29th to Nov. 10th, and a fortnight's "refresher" course in general medicine and surgery from Nov. 5th to 17th. Copies of the syllabus and full particulars regarding the above courses can be obtained from the secretary to the Fellowship of Medicine at 1, Wimpole-street, London, W., and as in some cases the numbers are limited, early application should be made.

GUY'S HOSPITAL BIENNIAL DINNER.—This dinner will be held at the Connaught Rooms, Great Queen-street, London, W.C., on Wednesday, Oct. 17th, at 7 P.M., Mr. G. Bellingham Smith presiding. The hon. secretary is Mr. Arthur W. Ormond, from whom further information may be obtained.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL.—The winter session will commence on Thursday, Oct. 4th, at 4 P.M., when Mr. William Stuart-Low will deliver an address on the Rôle of the Mucous Membrane in Diseases of the Nose, Throat, and Ear.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, QUEEN-SQUARE, BLOOMSBURY, W.C.—The syllabus of the post-graduate course to be held from Oct. 8th to Nov. 30th has now been issued. The course will consist of lectures and demonstrations on the Pathology of the Nervous System on Mondays at 12 noon; out-patient clinics on Mondays, Tuesdays, Thursdays, Fridays, 2 P.M. to 3.30 P.M.; clinical lectures and demonstrations on the same days at 3.30 P.M. Dr. J. Godwin Greenfield will give a course of lectures and demonstrations on Neuro-Pathology on Mondays at 12 noon.

MEDICAL DEFENCE UNION.—The annual general meeting of the Medical Defence Union will be held at the Royal Hotel, College Green, Bristol, to-day, Saturday, Sept. 29th, at 5 P.M., Sir Charles Ballance presiding.

Dr. Adam Patrick, of Glasgow, has been appointed Professor of Medicine at St. Andrews University in succession to Prof. A. M. Stalker.

ST. THOMAS'S HOSPITAL.—The old students' dinner will take place at the Princes' Restaurant, Piccadilly, on Oct. 26th, at 7 o'clock for 7.30. The chair will be taken by Mr. W. H. Battle.

MEDICO-LEGAL SOCIETY.—A meeting will be held at 11, Chandos-street, Cavendish-square, London, W., on Oct. 16th, when a paper will be read by Mr. W. Greaves-Lord, K.C., entitled Miner's Nystagmus, which will be followed by a discussion.

MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE SOCIETY.—The annual general meeting of the company will be held at Lincoln House, 300, High Holborn, W.C. 1, on Oct. 1st, at 4 P.M. Among other business a proposal will be considered that the sum of £1 1*s.* should be paid to the chairman and each director for every attendance at the meetings of the board or of committees of the board and general meetings.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—The opening of the eighty-second session of the school of pharmacy, 17, Bloomsbury-square, London, W.C., will take place on Oct. 3rd, when Dr. W. E. Dixon, F.R.S., will give the inaugural address at 3 P.M.

NATIONAL INSTITUTE FOR THE BLIND.—The second "Sunshine House" for blind babies has been opened at Birkdale, Southport. Nearly five years ago the first home of the sort was established at Chorley Wood, Herts. Since then the home has always been full, while there has always been a long waiting-list of infants. The establishment and maintenance of these homes go far to relieve present misery and distress and to minimise the possibility of future hardships by creating the ability to overcome them.

CHARING CROSS HOSPITAL MEDICAL SCHOOL.—The annual distribution of prizes will be held in the out-patients' hall of the hospital (entrance in King William-street) on Oct. 3rd, at 3.30 P.M. Dr. William Hunter will distribute the prizes and deliver an address entitled Some Problems of Modern Medical Education.

The *Annual Dinner of Past and Present Students* will take place on the evening of the same day in the Adelaide Gallery, Gatti's Restaurant, Strand, W.C., at 7 for 7.30 P.M., Dr. T. Watts Eden presiding. The guests present will include Lord Fairfax, Sir Donald Maclean, Sir Humphry Rolleston, and Prof. W. W. Chipman, of Montreal.

PSYCHOLOGICAL AND PHYSICAL DEVELOPMENT OF THE CHILD.—A series of six lectures for mothers on this subject will be held at Carnegie House, 117, Piccadilly. The lectures will be under the headings of the Baby (from birth to 5 years), the Child, and the Adolescent. The psychological aspect of infant life, childhood, and adolescence will be dealt with by Dr. H. C. Cameron on Nov. 6th, Dr. Niall on Nov. 13th, and Dr. Elizabeth Sloan Chesser on Nov. 20th; while the physical aspect will be discussed by Dr. Charles Anderson on Nov. 27th, Dr. Flora Shepherd on Dec. 4th, and Sir Bruce Bruce Porter on Dec. 11th. An introductory lecture by Dr. Crichton-Miller entitled the Well-meaning Mother on Oct. 30th, and a concluding one on Dec. 16th by Miss Smeeton, the Nurse and the Nursery, will complete the series. The lectures take place on Tuesdays at 3.15 P.M. Tickets (10*s.* 6*d.* for each lecture or £2 5*s.* for the series) may be obtained from Viscountess Erleigh, 65, Rutland-gate, London.

DONATIONS AND BEQUESTS.—Mr. James Philip Bauer, of Manchester and Blackpool, left £1000 to the Manchester Royal Infirmary to endow a bed to be called the "James Bauer" bed; £100 each to St. Mary's and Southern Hospital, Ancoats Hospital, and many other bequests to Jewish charities in Manchester.—During the past month subscriptions and donations have been received by the Manchester Children's Hospital, totalling £1718, including donations from the Hospital Saturday Fund of £1388 and Salford Musical Festival of £95.—Local charities in Manchester have profited to the extent of £1613 from the result of the St. Leger Sweepstake in Rusholme: Manchester Royal Infirmary, £500; St. Mary's Hospitals, £400; Ancoats Hospital, £163; Rusholme Nurses Fund, £100; and some other institutions in proportion.

CROMER COTTAGE HOSPITAL.—This well-equipped institution was presented to Cromer by the late Mr. G. W. Collison, and was opened on June 23rd, 1888. The hospital is a two-storied building, containing on each landing two large wards with eight beds in each, and two smaller wards for serious or operation cases, with two beds in each, the men's wards being on the ground floor, with an outside shelter for tuberculous cases, and the women's wards above, with a verandah opening out from the larger ward. The operating theatre is on the upper floor—a spacious apartment, about 21 feet by 20, with two large windows. For night operations an electric lamp is used and a new lamp is about to be installed at a cost of £50. The walls of the theatre are lined with glazed tiles, rounded off at all corners. A lift is installed. The hospital is provided with an X ray room, fitted up in June, 1913, by subscriptions from patients and well-wishers of Dr. H. C. Dent, on his retirement after 25 years' service. The resident staff consists of a matron, ward sister, and four probationer nurses. The medical staff is composed of the local medical men, Drs. R. Colvin-Smith, A. Burton and R. Grant, with two dental surgeons and a radiographer. Dr. F. W. Burton-Fanning, Norwich, is honorary consulting physician; Sir Hamilton Ballance and Mr. J. Burfield, of Norwich, honorary consulting surgeons, and Dr. A. J. Cleveland, Norwich, honorary consulting radiographer. The institution is supported by voluntary contributions, and fees are charged to patients as follows: Uninsured men and women, 10*s.* a week; insured men, 15*s.*, and insured women 12*s.* 6*d.* a week. Private patients are occasionally admitted at 3 guineas a week. The financial report for the year ending September, 1922, shows a balance of £153 4*s.* 10*d.* The medical report states that 262 patients were admitted during the year, 116 males and 146 females. Of these 245 were surgical cases, including 36 accidents, and 17 medical cases. Two hundred and six patients were discharged cured, 26 improved, and there were 17 deaths, and 11 patients remaining in the hospital. There were 95 X ray patients, hospital and private. There were 179 operations, including dental cases, and six operations under local anæsthesia. The daily average number of patients was 11, the average expenditure per patient £6 4*s.* 10*d.*, and the average expenditure per bed (20 beds) £81 15*s.* 5*d.*

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Oct. 2nd.

ORTHOPÆDICS: at 5.30 P.M. (Cases at 5 P.M.)

Presidential Address:
Mr. R. C. Elmslie: Manipulative Surgery.

Cases: The following cases will be shown by:—
Mr. Elmslie: Deformity of Spine of Tibia.
Mr. Laming Evans: The Result of Combined Steindler and Whitman Operations for Talipes Calcaneo-cavus.
Mr. W. H. Ogilvie: Three cases of Primary Myositis.
Mr. P. Bernard Roth: Fracture Dislocation of Radius.
Mr. Maynard Heath: Recurrent Dislocation of Inner End of Clavicle.
Mr. Whitchurch Howell: (1) Tendon Transplant for Wrist-drop; (2) Tendon Fixation for Foot-drop.

Thursday, Oct. 4th.

OBSTETRICS AND GYNÆCOLOGY: at 8 P.M.

Specimens:
Mr. Alfred B. Danby: A Uterus removed for Concealed Accidental Hæmorrhage. (Cæsarean hysterectomy.)
Mr. Everard Williams: Adenomyoma in a Malformed Uterus.

Short Communications:
Dr. H. Williamson and Dr. G. F. Abercrombie: A case of Inversion of the Uterus caused by a Squamous-celled Carcinoma of the Fundus.
Mr. W. Gilliatt: Placenta Prævia in Three Successive Pregnancies.

Paper:
Mr. Gordon Luker: Treatment of Puerperal Septicæmia. (A new method.)

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY, Oct. 1st.—10 A.M., Mr. Maingot: Surgical Pathology. 12 noon, Mr. Simmonds: Applied Anatomy. 2.30 P.M., Dr. Saunders: Medical Wards.

TUESDAY.—11 A.M., Dr. Paterson: Medical Wards. 12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept.

WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 12.15 P.M., Dr. Burnford: Medical Pathology. 2 P.M., Dr. Pernet: Skin Dept.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Dept.
FRIDAY.—10 A.M., Mr. Dudley Buxton: Dental Dept. 12 noon, Dr. Endean: Venereal Diseases. 2 P.M., Mr. Sinclair: Surgical Out-patients.
SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.
Daily, 10 A.M. to 6 P.M., Saturday, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

ST. MARY'S HOSPITAL MEDICAL SCHOOL POST-GRADUATE COURSE.
MONDAY, Oct. 1st.—11 A.M., Mr. Aleck Bourne: Anticipation of Mechanical Difficulties in Labour, illustrated by lantern slides. 12 noon, Dr. Wilfred Harris: Encephalitis Lethargica. 2 P.M., Dr. Graham Little: Diagnosis of Some Common Diseases of the Skin, illustrated by cases. 3 P.M., Prof. F. Langmead: Some Functional Disorders in Young Children.

LIVERPOOL UNIVERSITY CLINICAL SCHOOL.
(At 3.30 P.M. each day.)
MONDAY, Oct. 1st.—(At the Children's Hospital.) Dr. Fordyce: Glycosuria: (1) Cases of Diabetes Mellitus under Treatment with Insulin; (2) Cases of Non-diabetic Glycosuria, Diagnosis, Tests, Treatment.
TUESDAY.—(At the Southern Hospital.) Mr. Douglas-Crawford: Common Surgical Lesions of the Jaw.
WEDNESDAY.—(At the Northern Hospital.) Dr. Bligh: Types of Mental Defects in Children.
THURSDAY.—(At the Stanley Hospital.) Dr. Gullan: Diseases of the Endocrine Organs—notably Thyroid Gland, Pancreas, and Suprarenal Gland.
FRIDAY.—(At the Royal Infirmary.) Dr. Abram: Clinical Medicine.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.
TUESDAY, Oct. 2nd.—4.15 P.M., Dr. F. E. Tylecote: Some Recent Abdominal Cases.
FRIDAY.—4.15 P.M., Dr. Judson S. Bury: The Regional Diagnosis of Paralysis.

Appointments.

ASH, W. M., M.B., B.S. Lond., D.P.H., has been appointed Deputy Medical Officer of Health for the County of Middlesex.
BERRY, R. B., M.D., Ch.B. Vict., D.P.H., Medical Officer of Health for Gloucester.
ROWAN, J., M.B., C.M. Glasg., an additional Ophthalmic Specialist Medical Referee under the Workmen's Compensation Act for the Sheriffdom of Lanark.
STANSFIELD, TOM, M.B., B.S. Lond., Hon. Assistant Physician to the Royal Berkshire Hospital, Reading.
TURNER, MARY I., M.B., Ch.B. Vict., D.P.H., Assistant M.O.H., Chester.
Certifying Surgeons under the Factory and Workshop Acts: LEES, J. A., M.B., Ch.B. Vict. (Rawtenstall); BARTLETT, J. H., L.R.C.P. Edin., L.R.F.P.S. Glasg. (Harrold District of Bedford); CARSON, C. O., L.R.C.P. Lond., M.R.C.S. (Lydney).

Vacancies.

For further information refer to the advertisement columns.
Bristol Royal Infirmary.—Hon. Dental Surgeon.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Three Registrars.
Croydon Borough Sanatorium, North Cheam.—Res. Med. Supt.
Croydon General Hospital.—Jun. H.S. £150.
Derbyshire Royal Infirmary, Derby.—Two H.S.'s., H.P., &c. Each £200.
Duff House Private Hospital, Ruthin Castle, North Wales.—Res. Asst. P. £300.
Egyptian Government School of Medicine.—Lecturer in Experimental Physiology. L.E.540 a year.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. Also Res. M.O. £500.
Hospital for Sick Children, Great Ormond-street, W.C.—H.P. and Asst. Cas. O. £50. H.S. £50.
Hull City Asylum.—Jun. Asst. M.O. £300.
Italian Hospital, Queen-square, W.C.—Asst. Anæsth.
King's College Hospital.—Clin. Assts. Med. and Surg. Out-patient Officers. Sambrooke Med., Surg., and Obstet. Reg.
Kingston-upon-Hull City and County.—R.M.O. £400.
Leeds Public Dispensary.—Jun. Res. M.O. £150.
London Lock Hospital, 91, Dean-street, W.—H.S. £200.
Middlesex Hospital, W.—Radium Officer. £300.
Mount Vernon Hospital for Diseases of the Chest, Northwood, Middlesex.—Asst. Phys.
Newcastle-upon-Tyne City Hospital for Infectious Diseases.—Res. Med. Asst. £350.
Norwich, Norfolk and Norwich Hospital.—Hon. S.
Oswestry, Shropshire Orthopædic Hospital.—Res. Surg. O. £500. Two H.S.'s. £250.
Paddington Green Children's Hospital, W.—H.P. and H.S. Each £150.
Prince of Wales's General Hospital, Tottenham, N.—H.S. £150. H.P. £150. Also Jun. H.S. and Jun. H.P. £110 each.
Royal Eye Hospital, St. George's Circus, Southwark, S.E.—Hon. Asst. S. Also Jun. H.S. £75.
Royal Free Hospital, Gray's Inn-road, W.C.—Cas. O. £100.
St. Pancras Metropolitan Borough.—M.O.H. £1100.
South London Hospital for Women, Clapham Common, S.W.—Temp. Asst. P.
South Mimms, Barnet. Clare Hall Hospital and Sanatorium.—Asst. M.O. £350.
Staffordshire General Infirmary, Stafford.—H.P. £150.
West Bromwich and District Hospital.—Res. Asst. H.S. £180.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Sen. and Jun. H.S.'s. £150 and £100 respectively.
York, North Riding Mental Hospital.—Temp. Asst. M.O. 7 guineas weekly.
The Chief Inspector of Factories, Home Office, London, S.W., announces a vacant appointment at Wirksworth, Derbyshire.

Births, Marriages, and Deaths.

BIRTHS.

BREWERTON.—On Sept. 23rd, at Harley-street, W., the wife of Elmore Brewerton, F.R.C.S., of a daughter.
GILMOUR.—On Sept. 17th, at Dora-road, Wimbledon Park, S.W., the wife of Dr. A. Gilmour, of a son.
MACRAE.—On Sept. 20th, at Edwardes-square, Kensington, the wife of Captain A. Campbell Macrae, I.M.S., of a daughter.
NEIGHBOUR.—On Sept. 19th, the wife of Dr. Philip Neighbour, of Feltwell, Norfolk, of a daughter.

MARRIAGES.

BANFIELD—OSBORN.—On Sept. 20th, at St. Mary's the Virgin, Dover, by the Revd. Canon Elnor, Capt. E. L. Banfield, *M.C.*, Royal Irish Fusiliers Reserve of Officers, eldest son of Mr. R. Banfield, O.B.E., Deputy Chief Constable of Cornwall, and Mrs. Banfield, of Bodmin, to Hylda Gwynedd (Nancy), second daughter of Dr. F. A. and Mrs. Osborn, of Clyde House, Dover.
FIRMAN-EDWARDS—ANDERSON.—On Sept. 15th, at St. John's Church, Coulsdon, Surrey, Langdon Firman-Edwards, M.B. Cantab., to Hylda, younger daughter of Mr. and Mrs. C. Labat Anderson, The Durdans, Purley, Surrey.

DEATHS.

BOILEAU.—On Sept. 17th, Margaret Lucy Augusta Boileau, M.B., B.S., daughter of the late Sir Francis Boileau, Bart., of Ketteringham Park, Norfolk, aged 56 years.
MAGUIRE.—On Sept. 20th, at Stony Stratford, Bucks, Thomas S. Maguire, M.D., J.P., aged 78.
O'MALLEY.—On Sept. 20th, suddenly, at Haslar Hospital, Surgeon-Captain Edward O'Malley, R.N. (retired), of St. Ronans-road, Southsea.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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Notes, Comments, and Abstracts.

THE POSITION OF THE FRIENDLY SOCIETIES.

THE following is an abstract from the presidential address delivered by Mr. T. W. Huntley (Newcastle-upon-Tyne) at the National Conference of Friendly Societies held at Aberystwyth on Sept. 20th–22nd.

The question of the moment, said Mr. Huntley, was the new contract to be made with the doctors. The pre-war fee was 7*s.* 3*d.* per insured person per annum. After a demand from the doctors an arbitration award given early in 1920 raised the fee to 11*s.*, the difference being provided by an Exchequer grant and not by Health Insurance funds. A reduction of the fee to 9*s.* 6*d.*, effected in 1922, was to continue till Dec. 31st. After the issue of the Geddes Report on national expenditure, the Cabinet accepted a recommendation for the abolition of the Exchequer grant for medical service, and decided to introduce a bill to raise the contributions of the insured persons and employers. The proposal was strenuously opposed by the Consultative Council, on the ground that the time was inopportune for raising contributions, and the Council made a suggestion, which was accepted, that the amount required to maintain the contract with the doctors from April 1st, 1922, to Dec. 31st, 1923, should be borne by the accumulated funds of the approved societies.

Three points emerged from this position: (1) The possibility of a return to the pre-war per capitation fee of 7*s.* 3*d.* was clearly contemplated; (2) more than 7*s.* 3*d.* could not under any circumstances be paid from insurance funds without the full knowledge and approval of approved societies; (3) no repudiation by the Ministry of this condition had been made, but on the contrary Sir Alfred Mond, the then Minister, agreed to consult the approved societies.

Position of the Doctors.

The doctors' contentions, Mr. Huntley went on to say, were as follows: 1. The reduction of the capitation fee from 11*s.* to 9*s.* 6*d.* was agreed to on patriotic grounds and in ignorance of the fact that the insurance funds would bear the charge. 2. There were no grounds for a reduction of the present fee of 9*s.* 6*d.*, but there were reasons for an increase to 10*s.* 4*d.* and more. 3. The insurance funds were accumulating by millions a year and could carry a higher medical fee, and the fee should be a first charge upon the funds.

Criticism of Doctors' View.

In criticism of these contentions Mr. Huntley said that seeing that the additional payment was to be met by Exchequer grant they were not a party to the award of 11*s.*, but its grant caused them some surprise, and the Minister of the day said it was too high. To say that there was no ground for a reduction now was to ignore the fall in the cost of living since early in 1920, but many thousands of other people had not been allowed to ignore it. Nor could the following facts be overlooked: (1) That the original fee of 7*s.* 3*d.* was greatly in excess of what was received for club practice in pre-insurance days; (2) that no attempt had been made by reference to number of attendances per insured person or other statistics to prove that the fee is not a fair remuneration for the services rendered; (3) that the 7*s.* 3*d.* capitation fee gave an augmentation to the income of a large number of the profession such as no other circumstance has ever done and raised permanently their standard of living—that, in short, the doctors had done exceedingly well out of health insurance.

The claim that because the insurance funds were growing the present per capita fee, or a higher one, could be paid, and that this should be first charge on the funds, could not be admitted by any student of insurance. It meant the Act for the doctors, not the doctors for the Act. Of course the funds were growing, but with reference to the surpluses declared at the last valuation they could not overlook the actuary's warning that these had arisen through circumstances which could not be expected to be repeated—the abnormal death-rate of members of military age and the consequent premature release of reserves and high rates of interest.

Negotiation or Resistance.

It was their great desire to live and work in amity with the members of the medical profession. Theirs was a noble calling, and it was right to say that in the main panel doctors had given good service under their contracts. The Friendly Societies were not out for an underpaid medical service, but they did not think the original payment was less than the value of the service rendered. If the doctors could secure more from other sources they would assume the same attitude of non-intervention as before. The situation was not one for dictation by doctors and the societies must not falter in defending their members. They were prepared to negotiate, but if it was proposed to distribute beyond the present statutory limits any part of the funds for which they were trustees, without their full knowledge and agreement, then they would offer the most determined resistance.

A Resolution.

The Conference later passed a resolution to the effect that the sum paid from the funds of approved societies to insurance panel practitioners at the period when the agreement was terminated by the Government, on the recommendation of the Geddes Committee, was ample for the services rendered, and that no increase beyond 7*s.* 3*d.* per insured person payable out of approved societies' funds could be agreed upon without the consent of the societies.

A MATERNITY NURSING HOME ON HOSPITAL LINES.

MEDICAL men are often asked to name suitable homes to expectant mothers of the middle classes who wish to be confined away from their homes. The privilege of residing in the same house as her accoucheur has hitherto been largely confined to the class of women who use the big maternity and lying-in hospitals. Our attention has been drawn to Stone Field, Kidbrook-grove, Blackheath, London, S.E. 3, which is a large private house adapted as a maternity nursing home with two resident obstetricians and a staff of nurses holding the C.M.B. certificate. The home has 20 beds arranged in private rooms (7 to 11 guineas a week) and cubicles (6 guineas a week), these charges including motor service, patients being fetched free of charge from London and neighbouring districts, the service working day or night as required. Medical accouchement outfit is also provided free. With regard to medical fees, patients make arrangements with one of the residents or with their own doctor, who may conduct the confinement if it is desired. The house has spacious rooms and an attractive garden. Further particulars can be obtained from the matron of the home.

PUBLIC HEALTH IN BIHAR AND ORISSA.

(Concluded from p. 636.)

The Effect of Improved Agricultural Conditions on Crime.

IN the jails [1] of this province there was a considerable decrease in the numbers confined, from a total of 51,272 in 1920 to 42,290 in 1921, the average daily population being 5990, against 7845 in the previous year. The decrease is attributed by Colonel Sir H. E. Banatvala, C.S.I., I.M.S. (retired), Officiating Inspector General, to improved agricultural conditions, as shown by the large decrease (2423) in the offences against property; and in convictions for dacoity, which had been 361 in 1919 and 179 in 1920, but were only 111 in the year under report. The majority of the convicts were Hindus, but in proportion to the numbers of the free population in the province Mohammedans contributed 0·408 per 1000, Hindus 0·298, and Christians 0·227 per 1000. Of the total, 91·17 were illiterate. There was a considerable decrease in the number of youthful or juvenile offenders (under 20 years of age), from 855 in 1920 to 644 in 1921. Sir H. Banatvala remarks, very truly, that "it is unfortunate that we were obliged to keep in our juvenile jail boys under 16, lads of 16, and adolescents up to 21 years of age—all mixed together." He points out that 58 juveniles (under 16) were sentenced to from 2 to 15 days imprisonment, mostly for offences against property. "What useful purpose can be served by sending boys to a jail for such short periods I cannot imagine, and I think magistrates would exercise a sound discretion by availing themselves of Section 562, Criminal Procedure Code, or by releasing them after whipping—i.e., where allowed by law." It is to be hoped that this opinion will receive the attention it deserves. There is no doubt that juvenile offenders may receive very great and lasting benefit when undergoing terms of imprisonment long enough for the good influences brought to bear upon them to produce their effect; but time is required.

With regard to the health of the prisoners, the ratios of admission to hospital and average daily sick were 1163·0 and 48·9 per 1000, as compared with 885·6 and 42·1 in 1920. The death-rate also increased from 27·0 to 31·0, but this was below the mortality for the province (32·8). Gaya jail had the highest death-rate (74·1), a considerable increase over that of the previous year (55·9), due to cholera (11 deaths) and tubercle (13). At Cuttack the mortality was 50·2, compared with 14·6 in 1920, due chiefly to dysentery. There was an increase in cholera (32 cases and 14 deaths, against 13 and 5 in 1920); 23 cases occurred at Gaya (11 fatal). On the other hand, dysentery, so generally a scourge in jails, though causing 850 admissions to hospital, was fatal in only 24 cases (against 858 and 52 in 1920).

[1] Patna Government Press, 1922.

In many instances the predisposing cause is hookworm infection, with which parasite "the average percentage of infection in this province is about 70." Malaria caused 1302 admissions to hospital, but only 3 deaths (255·4 and 0·5 per 1000). For pulmonary tuberculosis there were 87 admissions and 35 deaths. Of the whole number of 14,284 convicts discharged during the year from the Central and Districts jails, 60 per cent. gained and only 16 per cent. lost weight, a most satisfactory result from the public health point of view.

Report on Vaccination.

The Report on Vaccination [2] for 1921–22, by Lieut.-Colonel W. C. Ross, states that the total number of operations performed fell from 1,060,485 in the previous year to 939,851 during the period now reviewed (April, 1921, to March, 1922). The decrease is attributed to political unrest and active interference with the work of the staff: "the vaccinators are now unwilling to work in many places, and their numbers are likely to decrease, as they cannot realise their fees fully." Of the total operations (925,134) performed by the staff, 98·26 per cent. were successful. The small-pox mortality in the province during the last five years has amounted to 55,691, while in the preceding quinquennium it had been 40,437. Colonel Ross considers that the disease cannot be "effectively dealt with and stamped out unless vaccination is made compulsory throughout the province"; he would recommend that the age should be extended to one year, that vaccination should be free, and that the supervision should be delegated to district boards and municipalities.

Hospitals and Dispensaries.

During the year 1921 25 hospitals and dispensaries [2] were opened in Bihar and Orissa, and five were closed, the total number of these institutions at the end of the year being 454; moreover eight new dispensaries have been added during 1922. This progress is encouraging and satisfactory. The report states that "it is hoped to carry through the ideal scheme of having a dispensary for each *thana* [police station] or for an area of each five square miles, in which area the medical officer of the dispensary will be responsible for the sickness of his area." As the area of the province is 83,181 square miles, this would mean 16,636 hospitals or dispensaries; probably "for each five miles square" is intended, which would mean 3327 institutions. "The great point is to have a medical officer who can reach at once the spot where epidemic disease breaks out, and so deal with it in the earlier stages, when it is possible to take effective action." This is undoubtedly a true economy in every way; *obsta principiis*. It is unfortunate that there is difficulty in getting doctors of the sub-assistant surgeon class, who at present prefer to avoid Government service; the cadre is always under strength. Altogether 4,003,991 patients were treated in 1921 at the various hospitals and dispensaries in the province, of which total 67,850 were in-patients; in 1920 the corresponding numbers had been 3,851,953 and 67,095. In the "State-Public, Local Fund, and Private-Aided Hospitals and Dispensaries" the total number treated was 2,962,623; the daily average of in-patients being 1781 and of out-patients 17,873. There was an increase in cholera mortality in the general population from 0·7 (in 1920) to 2·6 per 1000; the dispensary attendance rose from 4487 (with 605 deaths) to 12,230 (and 622 deaths) in 1921. "Until the rudiments of sanitation are thoroughly appreciated by the people, so long will the water-supplies of small towns and villages become infected on the return of villagers from cholera-infected parts. . . . All these matters require special consideration in the establishment of a public health organisation, which is urgently needed for the prevention of epidemic disease." As to plague, of which 1657 cases were treated, against 2161 in the previous year, "there is little that can be done with conditions as they are in Indian towns and villages." The people understand and appreciate the evacuation of houses, but what is required are rat-proof houses and grain-stores, and anti-plague vaccination. Small-pox admissions fell from 1532 in 1920 to 488 in 1921, but malaria increased from 755,423 to 824,252; owing to the increased cost of quinine it is impossible to obtain enough to allow it to be used in effective doses. There was some increase in pulmonary tubercle (6051 admissions and 143 deaths, compared with 5099 and 127 in 1920); intravenous injection of sodium morrhuate has given good results. There was also an increase in kala-azar (12,423 cases, against 8520 in 1920, and 5281 in 1919); treatment by intravenous injections of tartar emetic is much appreciated, and has no doubt led to an increase of admissions. In the eight leper asylums there were 1967 resident patients, compared with 1852 in 1920; this does not necessarily mean that leprosy is on the increase, but indicates that the lepers recognise the benefits of treatment. It is proposed to form a leper colony in the Santal Parganas (Bhagalpur Division), with the aid of the Santal Mission, to which a debt of gratitude will be due for this excellent scheme. A new radium institute has been built at Ranchi, and work in this direction has already been started by Lieut.-Colonel J. C. S. Vaughan, I.M.S. (retired), who is an expert in this treatment.

Progress is reported in many other directions, including improvement in maternity methods, the establishment of a medical college, and the introduction of post-graduate courses for assistant surgeons. Colonel Austen Smith, C.I.E., Inspector-General of Civil Hospitals, concludes his report by referring to the scheme for post-graduate courses for assistant and sub-assistant surgeons now in operation at the Calcutta Medical College, which will ensure their being kept up-to-date with medical science; and hopes that the pay and prospects of sub-assistant surgeons in the province will be improved, "as they are a very deserving body of Government servants, and I wish to see them a contented service."

[2] Annual Returns for 1921. Patna Government Press, 1922.

THE TREATMENT OF WHOOPING-COUGH WITH ARTIFICIAL SUNLIGHT.

Dr. Ferdinand Schotten,[1] of Cassel, has succeeded in relieving the distressing condition of the paroxysmal cough followed by vomiting which makes the nursing of whooping-cough such a trial to parents. He reports 10 cases, all between the ages of 1 and 5 years, and all in the stage between the eighth and fourteenth days after the first attack of coughing, that is between the catarrhal and convulsive stages, the most distressing period for the mothers. The children all had marked mucous expectoration and frequent paroxysms. The children were submitted to artificial sunlight with the chest exposed for five minutes every two days, the exposure increasing by three to five minutes each time. All the cases reacted promptly, and after three to four treatments the attacks became less frequent, especially during the night, when the children were suddenly awakened by an irritation in the throat, had to sit up, and finished by vomiting. Dr. Schotten does not think that pertussis can be cured by this treatment, but by reducing the attacks of vomiting the child feels better, the appetite improves, nourishment can be maintained, and weight is not lost. It is recognised that after whooping-cough the glands in the hilum of the lung become swollen, and remain so for a long period, and that tuberculosis often supersedes the disease. Dr. Schotten suggests that by improving the general condition of the patient the swelling of the glands may be prevented from becoming chronic and from forming a medium for other infections.

[1] Deutsche med. Wochenschrift, August 31st, 1923.

THE SPAS OF WESTERN ENGLAND AND CENTRAL WALES.

THE Great Western Railway Company have issued an attractive little booklet summarising the therapeutic advantages of the various spas and health resorts served by their lines [2] in the West of England and in Central Wales. In an introduction to the booklet the effect of the recent war upon the British spas is traced, and reference is made to the improved facilities for travel, hotel accommodation, and entertainment, which now enable these resorts to compete on equal terms with those of the Continent. Treatment at a British spa is now within reach of many people for whom visits to continental resorts are out of the question, and the comparative cheapness and ease of travel to the former are here emphasised. The spas dealt with are Bath, Cheltenham, Church Stretton, Droitwich, Leamington Spa, Malvern, Torquay, Weymouth, Builth Wells, Llangammarch Wells, Llandrindod Wells and Llanwrtyd Wells. Two or three pages of historical and geographical description, with notes of the type of cure practised, and in many cases with analyses of the waters, are included in regard to each of the places named; good illustrations and a summary of the specific therapeutic benefits obtainable enhance the value of this little publication.

[2] Inland and Marine Spas on the Great Western Railway. Published by the Company, Paddington Station, London, W. 2.

COMBINED W.C. TRAP AND SOIL-PIPE BRANCH.

Messrs. John Knight and Sons, of 26, Cale-street, Chelsea, S.W. 3, have sent us particulars of a combined W.C. trap, and soil-pipe branch which is carried through the wall of the house. There are no joints to either drain or soil-pipe within the house, and as the trap is fixed clear of the floor the space beneath the pan can be easily kept clean. The pipe branches are made for 9 in., 14 in., and 18 in. walls.